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POISONED PATRIOTS: CONTAMINATED DRINKING WATER AT CAMP LEJUENE

HEARING

BEFORE THE

SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS

OF THE

COMMITTEE ON ENERGY AND COMMERCE
HOUSE OF REPRESENTATIVES

ONE HUNDRED TENTH CONGRESS

FIRST SESSION

JUNE 12, 2007

Serial No. 110–56

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POISONED PATRIOTS: CONTAMINATED DRINKING WATER AT CAMP LEJUENE

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POISONED PATRIOTS: CONTAMINATED DRINKING WATER AT CAMP LEJUENE

TUESDAY, JUNE 12, 2007

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS,
COMMITTEE ON ENERGY AND COMMERCE,
Washington, DC.

The subcommittee met, pursuant to call, at 10:04 a.m., in room 2322, Rayburn House Office Building, Hon. Bart Stupak (chairman) presiding.

Present: Representatives Inslee, Solis, Dingell, Whitfield, Walden, and Burgess.

Staff present: John Sopko, John Arlington, Joanne Royce, Scott Schloegel, Kyle Chapman, Alan Slobodin, Dwight Cates, and Matthew Johnson.

OPENING STATEMENT OF HON. BART STUPAK, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. STUPAK. The subcommittee will come to order.

Today we have a hearing entitled "Poisoned Patriots: Contaminated Drinking Water At Camp Lejeune." Each Member will be recognized for a 5-minute opening statement. I will begin.

This is the first in a series of hearings this committee will be holding to examine whether the Pentagon is adequately protecting the American people, including military personnel and their families, from risks associated with environmental contamination at its facilities. In this hearing we will explore the tragic narrative of why tens of thousands of Marines and their families were exposed to highly contaminated drinking water at Marine Corps Base Camp Lejeune for nearly 30 years.

Three years ago this committee heard testimony from Jerry Ensminger, a 24-year-old Marine Corps veteran, who raised serious questions about why both the Department of the Navy and the Marine Corps waited 5 years before notifying Camp Lejeune residents that the drinking water was highly contaminated. Mr. Ensminger also raised questions about whether the Navy and Marine Corps were cooperating with the Agency for Toxic Substances and Disease Registry, ATSDR, which has been engaged for the last 8 years in studying the connection between exposure to contaminated drinking water at Camp Lejeune and the increased instance of cancer and birth defects of children at the base.

Over 20 years after the Marine Corps finally took the contaminated wells out of service, these and countless other questions remain unanswered or inadequately addressed.

The purpose of this hearing today is to get some answers.

When did the Marine Corps learn that the drinking water at Camp Lejeune, a military base, nearly 100,000 residents were contaminated with dangerous chemicals?

If the contamination was first discovered in 1980, why did the Marine Corps wait until 1985 before it closed its wells?

Why were the closed wells not immediately capped and abandoned, but continued to be used to supply water at various times up to and through 1987?

When and how were the residents told about the contamination?

Was the notification adequate?

Did exposure to drinking water cause cancer and birth defects in children conceived at the base? What about adults who drank the water?

How has the Marine Corps responded to those affected? Has it taken care of its own? Has the Marine Corps continued with *Semper Fidelis*, or always faithful?

Why is the ATSDR study taking so long? Will the study be published as scheduled by December 2007? Has the military intentionally delayed the study?

Today we welcome back Mr. Ensminger who knows firsthand the horrible consequences of the military's failure to detect and clean up the toxic drinking water at Camp Lejeune. His daughter Jane was born in 1976 at Camp Lejeune; 6½ years later she was diagnosed with leukemia. Jane died when she was 9 years old in 1985, the same year that the poisoned wells were first shut down.

Mr. Ensminger is joined on the first panel by Michael Gros and Jeff Byron who likewise painfully know only too well the devastation caused by exposure to the poisoned drinking water at Camp Lejeune.

Jeff Byron, a former air traffic controller, moved his family into base housing at Camp Lejeune in 1982, 3 months after his first daughter Andrea was born, and 2 years before Rachel was born. Rachel is developmentally disabled, has spina bifida, and was born with a cleft palate. Andrea has a rare bone disease known as aplastic anemia.

Dr. Michael Gros, a Navy obstetrician at the time at Camp Lejeune, contracted T-cell lymphoma and can no longer practice medicine. Dr. Gros spent his entire time in the Marine Corps at Camp Lejeune and he and his family lived in base housing.

We are deeply grateful to these three witnesses for coming forward to share their painful stories with our committee.

We will also hear from officials at the Agency for Toxic Substance and Disease Registry, ATSDR, about the study initiated in 1999 which examines whether individuals born between 1968 and 1985 to mothers who drank contaminated water while they were pregnant and living at Camp Lejeune are at increased risk of developing certain childhood cancers and/or birth defects. We will hear whether the Department of the Navy and the Marine Corps have been forthcoming in their efforts to assist ATSDR in this critical study. We also hope to learn why the Department of the Navy was resistant to funding the ATSDR study despite a Federal statute requiring that it do so. Why did DoD refuse to fund ATSDR activities at Camp Lejeune for 3–4 years from 1998 through 2000? Did military obstruction and lack of funding delay completion of the study? More importantly, does ATSDR have accurate information on which to base its study? Why aren't all the Marines and their families who were exposed to this contaminated water included in the study?

The principal contaminant of the drinking water at Camp Lejeune was a volatile organic compound referred to as TCE, or trichloroethylene. TCE, a volatile organic compound, is an industrial cleaning solvent widely used in defense and commercial and industrial applications. TCE is the most widespread water contaminant in the Nation, and almost every major military base has a Superfund site with TCE contamination.

TCE was also the main contaminant at the Woburn, Massachusetts Superfund site made famous by the best selling book, A Civil Action. That book and the movie based on it illustrated very well the horrible toll that TCE can take on the human body. But here is an important frame of reference. As bad as the contamination was at Woburn, the concentrations of TCE at Camp Lejeune were as much as 10 to 15 times higher.

We have a chart. Here is what EPA has proposed. There is a current standard, 5 parts per billion; Woburn is 267; Hadnot, which is one of the wells, was 3,400. In Hadnot on February 7, 1985, over 18,000 parts per billion in the water.

In 2001, EPA attempted to issue a risk assessment that found TCE to be at least twice as carcinogenic as originally thought, and possibly 40 times as carcinogenic. The Defense Department aggressively opposed the EPA's finding, labeling it "junk science" and sided with the White House to derail issuance of the tough new TCE standard. Instead, the issue was referred for study by the National Academy of Sciences, delaying for years any conclusions about whether millions of Americans, including the residents at Camp Lejeune, were contaminated by TCE. The EPA standard was vindicated and accepted a year ago by the National Academy of Sciences.

Nevertheless, this obstruction of environmental prerogative has been the modus operandi of the Defense Department for years now, since at least 2001. The Pentagon has sidetracked environmental regulations, opposed EPA efforts to set strict reclusion limits, stalled and underfunded cleanups and ignored Federal and State environmental regulators. Moreover, every year, right up through 2006, the Defense Department has sought to exempt itself from environmental laws.

Those days are over. Nearly 1 out of 10 Americans live within 10 miles of a military site listed on the Superfund National Priority List for hazardous waste cleanup. The American people, military and civilian alike, deserve to work and live in communities where drinking water is safe and the air they are breathing does not threaten their lives.

I next turn to my friend from Kentucky, Ranking Member of the subcommittee, Mr. Whitfield, for an opening statement, please.

OPENING STATEMENT OF HON. ED WHITFIELD, A REPRESENTATIVE IN CONGRESS FROM THE COMMONWEALTH OF KENTUCKY

Mr. WHITFIELD. Chairman Stupak, thank you very much. And we thank you for holding this important hearing. For many years, Congress has demanded answers about drinking water contamination at Camp Lejeune, and today we will get an update on what we've learned in that study. In particular, we look forward to the testimony from the Government Accountability Office that will detail the findings of its May 2007 report on Camp Lejeune. Congress mandated this study in the 2005 Defense Authorization Act.

Just last year Congress passed several legislative provisions relating to Camp Lejeune. Section 318 of the 207 Defense Authorization Act requires the National Academy of Sciences to conduct a comprehensive review and evaluation of the available scientific and medical evidence regarding associations between prenatal, child, and adult exposure to drinking water contaminated with trichloroethylene, TCE, and PCE, perchloroethylene at Camp Lejeune. This comprehensive study will expand on the Agency for Toxic Substances and Disease Registry's ongoing study at Camp Lejeune.

The 2007 defense bill also requires the Marine Corps to notify Camp Lejeune residents and employees who may have been exposed to contaminated drinking water of the results of the ATSDR study. Congress wants to know the facts and we want to provide that information to our service members and their families.

Last week, Ranking Member Barton and I sent a letter to ATSDR requesting information on exposures to contaminated drinking water at 22 other military facilities. Committee staff identified these facilities based on a search of contamination records in ATSDR databases. At several facilities the level of TCE contamination in drinking water is comparable to levels found at Camp Lejeune. For instance, McClellan Air Force Base in California and the Wurtsmith Air Force Base in Michigan each had extensive TCE contamination in drinking water at levels of public health concern. In its public health assessment of the Wurtsmith Air Force Base, ATSDR concluded past exposure to groundwater may have posed an increased risk of developing adverse health effects. ATSDR assumes tap water was contaminated with TCE at 1,100 parts per billion between 1962 and 1977. Unfortunately, no one has investigated this matter, and we don't know the real extent of exposure or whether any adverse health effects occurred. We need to have these questions answered.

In response to our letter, ATSDR has provided a list of nine military bases where past exposures to TCE and PCE were considered a public health hazard. Mr. Chairman, I hope that we can use this list as a starting point to conduct more oversight at these facilities. The military personnel at these sites deserve to know if they were exposed to contaminated drinking water and what the potential public health implications are for them and their families.

Drinking water contaminated with TCE and other volatile organic compounds is not just a problem at military facilities. In my own district, the Paducah Gaseous Diffusion Plant has extensive groundwater contamination, including several contaminated residential drinking water wells. Fortunately, relatively few residents were exposed to the contaminated drinking water and detailed information on health impacts is available from independent research conducted by the University of Cincinnati.

Today we are also releasing information regarding TCE contamination at several municipal and private sites. According to ATSDR the Sol Lynn Industrial Transformer Site in Houston, Texas, had tap water with TCE concentrations of 953,000 parts per billion. The Barnhart site in Illinois had tap water with TCE concentrations of 730 parts per billion. Further, the San Fernando Valley aquifer in North Hollywood, California, had TCE concentrations as high as 18,000 parts per billion. Unfortunately, little is known about the possible health impacts of the 800,000 residents of Los Angeles, Burbank, and Glendale who drank water from this contaminated aquifer for years. These sites also deserve our attention.

Mr. Chairman, the more we learn about this problem, the more we believe we may actually need to craft legislation to ensure that professional public health officials can help find the answers to these concerns. And I know I look forward to working with you on whether or not we need to identify whether ATSDR and other health agencies need more authority and more funding to investigate past exposures to TCE and other volatile organic compounds.

And, Mr. Chairman, I ask unanimous consent that an opening statement of the ranking member, Mr. Barton, be inserted into the record. He is unable to be with us. And then also the letter that I referred to that we wrote to ATSDR about these other sites, and the records that they provided to us about the contamination at the other sites. I would ask consent that we will enter those into the record.

Mr. STUPAK. without objection, the opening statement of Ranking Member Joe Barton will be entered into the record, and also the June 6, 2007 letter to you and Mr. Barton with attachments will also be part of the record as well as any other statements by members for the record.

[The prepared statements of Mr. Barton and Mr. Green follow:]

PREPARED STATEMENT OF HON. JOE BARTON, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

I thank the chairman for holding this hearing. This problem at Camp Lejeune is hardly a new one, but it is important that we get to the bottom of why military personnel there were exposed to contaminated drinking water for so long. As early as 1980, significant contamination was discovered in the drinking water, but 5 years passed before the Navy finally identified the contaminated wells and shut them down.

I am not persuaded by the Navy's justification that they did not know the contamination was significant in 1980, or that the drinking water met regulatory requirements in place at that time. The fact is the contaminated wells should have been identified and shut down immediately. This is a simple matter of right and wrong. The delay may not have been criminal, but it was unmistakably immoral.

Stories conflict on why it took so long, and they involve a complicated series of events. Unfortunately, the committee staff has not had enough time to thoroughly investigate. The minority staff first learned of this hearing just 4 weeks ago, and the first briefing from the Navy occurred just 3 weeks ago. On important matters such as this, 3 weeks is simply not enough time to conduct serious, thoughtful oversight.

Fortunately for the subcommittee, several Federal agencies have devoted the time and energy necessary to fully review drinking water contamination at Camp Lejeune. Today we will hear from the Environmental Protection Agency, the Government Accountability Office, and the Agency for Toxic Substances and Disease Registry on their extensive research.

Camp Lejeune is the poster boy for contaminated drinking water on a military base, but it certainly is not the only one. I think we can anticipate learning of even worse problems at other bases. Last week, Representative Whitfield and I sent a letter to ATSDR to obtain information regarding extensive drinking water contamination at nearly two dozen military facilities.

Based on the data we have uncovered, some of these facilities likely had exposures in excess of what we know occurred at Camp Lejeune. Past contamination is also a problem at civilian municipal facilities, and we need answers on those facilities as well.

Mr. Chairman, we are prepared to dig into these issues. We have laid the groundwork for a serious investigation of drinking water contamination at military and civilian facilities. I hope that we can work on a bipartisan basis. There is no reason why we shouldn't.

PREPARED STATEMENT OF HON. GENE GREEN, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF TEXAS

Thank you, Mr. Chairman, for holding this hearing on contaminated drinking water at Camp Lejeune.

This hearing is the first in a series of hearings on contaminated drinking water on our military bases.

We ask our military personnel to protect and defend our country. It is my belief that we have a responsibility and an obligation to protect our military personnel and their families when they are living on military bases.

We know the chemicals TCE and PCE were contaminating at least eight sights in the water system in and around Camp Lejeune.

The exact date of contamination is unknown, but it seems that Camp Lejeune officials may have known about the TCE and PCE in the wells as early as 1980. They did not close the contaminated wells until 1985 and even reopened the wells periodically from 1985 until 1987.

TCE and PCE are clear and have no odor. For 7 years the military personnel and their families at Camp Lejeune were unknowingly bathing, drinking, and cooking with this contaminated water.

The EPA recommends contamination levels for TCE and PCE in drinking water at 5 parts per billion. Those living at Camp Lejeune were in some cases exposed to TCE and PCE levels over 1,000 parts per billion.

Camp Lejeune was declared a Superfund in 1989 and the DoD's remediation process has been ongoing since that time. The EPA expects the cleanup to be completed in 2011.

Currently, our office is wading through the process of having a toxic waste site in our district declared a Superfund. We are just beginning the process, but I certainly hope that it would not take some 18 years to clean up our site.

There are many unanswered questions surrounding the contaminated water at Camp Lejeune. I know many of us on the committee want to know why military personnel who may have been exposed to TCE and PCE while living at Camp Lejeune still have not been notified of their potential health risks.It seems to me that Camp Lejeune is an example of how we failed to responsibly protect our troops and their families. This hearing is an opportunity to shed some light on the unresolved issues at Camp Lejeune.

Thank you Mr. Chairman, I yield back my time.

Mr. WHITFIELD. I think you and your staff were given copies of those, and thank you very much, Mr. Chairman. My time has expired.

Mr. STUPAK. I know there's a Health Subcommittee going on so, Mr. Walden, you will be next then.

Mr. WALDEN. Thank you very much Mr. Chairman. I am going to waive an opening statement. I would like to hear from the witnesses. I will have comments to make during expanded Q&A.

Mr. STUPAK. Mr. Burgess, you are welcome to make an opening statement.

Mr. BURGESS. Thank you, Mr. Chairman. I too will waive an opening statement. I would just respectfully suggest there's probably more sites than the one we have under discussion today, and perhaps this committee could gently urge the Department of Defense to use the money appropriated to clean up the sites around the country for which cleanup has already been authorized.

I will yield back the balance of my time.

Mr. STUPAK. Very good. That concludes all the opening statements of members. Other members may be coming. We will allow them an opening statement if they so choose at the appropriate time. As I said there's a couple other hearings going on of the Energy and Commerce Committee. So that concludes the opening statements by members of the subcommittee.

I will call our first panel of witnesses to come forward. They are already here. Mr. Ensminger, Dr. Gros, and Mr. Byron. Gentlemen, it's the policy of this subcommittee to take all testimony under oath. Please be advised that witnesses have the right to counsel to be present while they testify and be advised by counsel during testimony.

Do any of you wish to be represented by counsel today? No one indicating they are, so I will take that as a "no." and I'm going to ask you, would you please rise and raise your right hand to take the oath.

[Witnesses sworn.]

Mr. STUPAK. let the record reflect the witnesses replied in the affirmative. You are now under oath. We will now go with opening statements from our witnesses. Let's start on my right.

Mr. Byron, if you would, please, sir, if you press that button in front of you to turn on your mike.

STATEMENT OF JEFF BYRON

Mr. BYRON. Thank you. Good morning, my name is Jeff Byron. I served my country honorably in the United States Marine Corps from June 1981 to June 1985. I have been invited to give testimony here today on the events surrounding the toxic water contamination that occurred at Camp Lejeune Marine Corps Base. The contamination took place between the years 1957 through 1987. I am here to tell you of the negative impact that exposure to VOCs has had on my family's medical history, past and present.

After boot camp and air traffic controller school, I was assigned a permanent duty station at Marine Corps Air Station, New River, Jacksonville, North Carolina. The Air Station provides air support for Camp Lejeune. When we arrived in Jacksonville, I applied for base housing. None was available. It would be a 6-month wait, and therefore we lived out in town.

My oldest child Andrea was born in June 1982. Two months later our family moved to Midway Park base housing complex. Midway Park is directly across from the main gate at Camp Lejeune. In August 1983, renovation of Midway Park forced our family to move to other base housing. We were assigned quarters at 3114 Bougainville Drive and Tarawa Terrace base housing complex. During our stay in base housing, my daughter Andrea was seen by doctors at the Naval Hospital on Camp Lejeune 57 times in 30 months for such illnesses as rashes, urinary tract infections, yeast infections, and unexplained fevers. Most of the time the medical personnel on base did not have an explanation for her symptoms. We were told to give her tepid baths and children's Tylenol to reduce the fevers.

During this time my wife and I conceived our second child, Rachel. She was born April 27, 1985, 6 weeks prior to my discharge from active duty. On her initial newborn profile from Onslow Memorial Hospital, there were no abnormalities listed. But when we took her to the base hospital for her first newborn checkup, the hospital officials noted the following medical concerns: She had slow weight gain, a heart murmur, a double ear infection, umbilical hernia, brachial dimples and posteriorly rotated ears, a large hemangioma—which is a birthmark—on her lower back, and what they listed as ASD. I'm not sure what that is.

It was also noted to speak to a pediatrician as soon as we arrive home and shows that the patient is leaving in 4 days and may need an EKG, a CRR, and a cardiac referral. She had to be fed in an infant seat because of projectile vomiting. She was labeled "a failure to thrive baby." Two weeks later, June 25, 1985, I was discharged from Active Duty service from the United States Marine Corps.

Six months after being discharged from the Marine Corps, Andrea, our first born, was diagnosed with a rare bone marrow disorder called aplastic anemia. Andrea was treated at Cincinnati Children's Hospital Medical Center, which at the time was considered the No. 2 hematology department in the country. The head of the hematology department asked us: What chemicals have you been exposed to? Our answer was none. They asked us for all the names of cleaning and hygiene products that we used. All of the products were ruled out. Andrea was in the hospital under quarantine for 30 days. Andrea was given blood and platelet transfusions. She was treated at Children's Hospital until she was 12 years old.

Can you imagine, I had my oldest daughter in the hospital with a bone marrow disease, under quarantine, while my youngest daughter was seeing multiple medical specialists for birth defects, and my wife, 6 months pregnant with twin boys. I don't know how we did it.

Andrea's aplastic anemia is in remission now, but her doctors have told her there is a 50 percent chance the disease could return if Andrea decides to have children of her own.

It was 15 years after my discharge, May 27, 2000, when we received a letter from the National Opinion Research Center, who was contracted on behalf of the Department of Health and Human Services to do the survey and contact people that lived at Marine Corps Base Camp Lejeune. They were requesting that our family participate in a survey concerning toxic water contamination, specifically those children who were in utero and born while residing in base housing, Tarawa Terrace, Hadnot Point. They requested that our youngest daughter Rachel participate in a survey.

When the survey results came out, we were shocked to find out our daughter was not identified as a study participant since her documented medical records confirmed that she had two of the births defects of interest: cleft palate and spina bifida.

After we confronted ATSDR officials about her medical records which we had provided previously to them, they agreed that she had one of the birth defects of interest and therefore qualified as a study participant. It was quite clear to me after reading questions that were part of the survey that the Marine Corps had been aware of this situation for a very long time. From documents we obtained through the Freedom of Information Act request, we were able to determine that Marine Corps/DoD environmental personnel on base were well aware of the VOC contamination before our family moved into base housing, and therefore could have intervened and prevented the adverse health effects suffered by my family as well as other families whose medical history is similar to my own.

It was supposedly a notice to the residents of Tarawa Terrace that was distributed by the base commander in April 1985 that showed the base officials were more concerned with water usage than informing the residents of the risk of drinking, bathing, and cooking with contaminated water. The GAO report on page 29 does not reflect this point because they have not presented the document in its entirety.

The Marine Corps was morally responsible for providing clean, potable water, no matter who the contaminator was, especially after the contamination was discovered. According to the GAO report, GAO repeats over and over that Headquarters Marine Corps, DoD, and Marine Corps Base Camp Lejeune officials took no action.

Our family had already scheduled a vacation in North Carolina in 2000. We wanted to show our daughters where they were born. While we were in Jacksonville we went to Onslow Memorial Hospital to request copies of our daughters' birth records. We were very surprised to find out that all records were destroyed after 7 years. We then went to ABC 1-hour dry cleaners, which was a primary source of contamination from PCE at Tarawa Terrace base housing.

I took my 35 millimeter camera and took pictures of the facility that cost taxpayers $4.3 million to clean up. After the film had been developed, it was apparent that safe operating procedures were not in place. There was also a Marine Corps warehouse across the street and base housing that had several blue barrels surrounding the brick structure. On subsequent visits to Camp Lejeune, these barrels were no longer visible.

I would like to thank the Oversight and Investigation Subcommittee personnel for inviting me to give testimony here today. And I would like to thank the members of the House Energy and Commerce Committee for hearing my testimony. I would like to especially thank the former residents of Marine Corps Base Camp Lejeune for being here.

Thank you very much. That's my statement.

Mr. STUPAK. Thank you Mr. Byron.

[The prepared statement of Mr. Byron follows:]

STATEMENT OF JEFF BYRON

Good morning. My name is Jeff Byron. I served my country honorably in the United States Marine Corps from June 1981 through June 1985. I have been invited to give testimony here today on the events surrounding the toxic water contamination that occurred at Marine Corps Base, Camp Lejeune. The contamination took place between the years 1957 through 1987. I am here to tell you of the negative impact that exposure to VOCs has had on my family's medical history, past and present.

After boot camp and Air Traffic Controller school I was assigned a permanent duty station at Marine Corps Air Station, New River, Jacksonville, North Carolina. The Air Station provides air support for Camp Lejeune. When we arrived in Jacksonville I applied for base housing. None was available, it would be a 6-month wait, and therefore we lived out in town. My oldest child, Andrea, was born in June of 1982. Two months later our family moved to Midway Park base housing complex. Midway Park is directly across from the main gate of Camp Lejeune. In August of 1983 renovation of Midway Park forced our family to move to other base housing. We were assigned quarters at 3114 Bougainville Drive in Tarawa Terrace base housing complex. During our stay in base housing my daughter, Andrea, was seen by doctors at the Naval Hospital on Camp Lejeune 57 times in 30 months for such illnesses as rashes, urinary tract infections, yeast infections and unexplained fevers. Most of the time the medical personnel on base did not have an explanation for her symptoms. We were told to give her tepid baths and children's Tylenol to reduce the fevers. During this time my wife and I conceived our second child, Rachel. She was born April 27, 1985, 6 weeks prior to my discharge from active duty.

On her initial newborn profile from Onslow Memorial Hospital there were no abnormalities listed. But when we took her to the base hospital for her first new-born check, up the hospital officials noted the following medical concerns:

- Slow weight gain
- A heart murmur
- Double ear infection
- Umbilical hernia
- Brachial dimples and posteriorly rotated ears
- A large hemangioma (raised birthmark) on her lower back
- ASD

It was noted "Speak to pediatrician as soon as arrive home-are leaving in 4 days-may need EKG, CRR & cardiac referral". She had to be fed in an infant seat because of projectile vomiting. She was labeled "a failure to thrive baby". Two weeks later, June 25, 1985, I was discharged from active duty service from the Marine Corps.

Six months after being discharged from the Corps, Andrea, our first born, was diagnosed with a rare bone marrow disorder called aplastic anemia. Andrea was treated at CCHMC (Cincinnati Children's Hospital Medical Center), which at that time was considered the #2 hematology department in the country. The head of the hematology department asked us what chemicals we had been exposed to, our answer, none. They asked us for all of the names of cleaning and hygiene products that we were using. All of the products were ruled out. Andrea was in the hospital under quarantine for 30 days. Andrea was given blood and platelet transfusions. She was treated at Children's Hospital until she was 12 years old. Can you imagine, I had my oldest daughter in the hospital with a bone marrow disease, under quarantine. While my youngest daughter was seeing multiple medical specialist for birth defects, and my wife 6 months pregnant with twin boys. I don't know how we did it. Andrea's aplastic anemia is in remission now, but her doctor has told her that there is a 50 percent chance the disease could return, if Andrea decides to have children of her own and becomes pregnant.

It was 15 years after my discharge, May 27, 2000 we received a letter from The National Opinion Research Center who was contracted on behalf of the Department of Health and Human Services to do a survey and contact people that lived at Marine Corps Base Camp Lejeune. They were requesting that our family participate in a survey concerning toxic water contamination, specifically those children who were in utero and born while residing in base housing, (Tarawa Terrace, Hadnot Point). They requested that our youngest daughter, Rachel, participate in the survey. When the survey results came out we were shocked to find out that our daughter was not identified as a study participant, since her documented medical records confirmed that she had two of the birth defects of interest, cleft pallet, and spina-bifida. After we confronted ATSDR officials with her medical records, which we had previously provided to them, they agreed that she had one birth defect of interest, and therefore qualified as a study participant. It was quite clear to me after reading questions that were part of the survey, that the Marine Corps had been aware of this situation for a very long time. From documents that we obtained through the Freedom of Information Act requests, we were able to determine that the Marine Corps/DoD environmental personnel on base were well aware of the VOC contamination before our family moved into base housing. And therefore could have intervened and prevented the adverse health effects suffered by my family as well as other families, whose medical history is very similar to my own.

There was supposedly a Notice to the Residents of Tarawa Terrace, that was distributed by the base commander in April of 1985. That showed that base officials were more concerned with water usage than informing the residents of the risk of drinking, bathing, and cooking with contaminated water. (The GAO report page 29, does not reflect this point because they have not presented the document in its entirety) The Marine Corps was morally responsible for providing clean potable water, no matter who the contaminator was, especially after the contamination was discovered. According to the GAO report, GAO repeats over and over that Head Quarters Marine Corps/DoD, and MCBCL officials took no action .

Our family had already scheduled a vacation to North Carolina in 2000. We wanted to show our daughters where they were born. While we were in Jacksonville, we went to Onslow Memorial Hospital to request copies of our daughters' birth records; we were very surprised to find out that all records were destroyed after seven years. We then went by ABC 1 hour dry cleaner, which was the primary source of contamination from PCE at Tarawa Terrace base housing. I took my 35mm camera and took pictures of the facility that cost tax payers 4.3 million dollars to clean up. After the film had been developed it was apparent that safe operating procedures were not in place. There was also a Marine Corps well house across the street in base housing that had several blue barrels surrounding the brick structure. On subsequent visits to Camp Lejeune, these barrels were no longer visible.

To me it was apparent that the Marine Corps had known for 20 years, before they had decided to tell my family of the exposure. I felt that they had wronged my family and others that had served this country as patriots. It was quite obvious that "Semper Fi", always faithful, did not apply to us. I was raised to believe that to get something done you had to do it yourself. That is what I and others are doing. Those of us that have become activists want to ensure that this American tragedy never happens again. I have attended all of the ATSDR meetings concerning Camp Lejeune with the exception of the Water Modeling Scientific Panel. I am a sitting member of the Community Assistance Panel with the ATSDR, tasked with evaluating the possibilities of doing further studies on children and adults exposed at Camp Lejeune. I accompanied Jerry Ensminger to the hill when he gave testimony to a subcommittee hearing for Energy & Commerce concerning DoD's request to obtain exemptions from environmental law. I am happy to say that with Jerry's testimony, DoD was denied exemption. I attended the Commandant's fact finding panel in Jacksonville, NC. where according to the GAO report (page 46) the panel made several finding criticizing Camp Lejeune and Department of the Navy. One said, "Communications to Camp Lejeune residents regarding drinking water contamination was not detailed enough to completely characterize the contamination found at the time of the well closures" Notice to Residents of Tarawa Terrace—from the base commander. In my opinion, misleading at best. We started a web site, The Few, The Proud, The Forgotten, *www.tftptf.com*, in an attempt to provide documented history to the former residents so that they can make informed decisions regarding their future. To educate the public and government officials, to the events surrounding toxic water exposures at Camp Lejeune.

Because of my involvement with ATSDR as a cap member the Government Accountability Office allowed me and others to read, and comment on a copy of their draft report, "Defense Health Care Activities Related to Past Drinking Water Contamination at Marine Corps Base Camp Lejeune". After reading the draft report I have come to the conclusion that the GAO had not done its homework and it had depended upon the Marine Corps Headquarter explanation of documentation, and did not check their source. A Marine Corps document providing the sampling result stated that ND meant "none detected." (page 28 1st note of the GAO report) The document that is being referred to, GAO has removed the column that shows the instrument's detection limit. On this same document a zero at the end of one PCE reading was missing, miss leading the reader to think that the meter read 158 parts per billion, in reality the reading was 1580 parts per billion. This is just one deception that I have uncovered in the GAO report.

While ATSDR did not always receive requested funding and experienced delays in receiving information from DoD for its Camp Lejeune related work, ATSDR officials said this has not significantly delayed their work. This was stated no less than 5 times in the GAO report. When something is overstated, it tends not to be true. I was also shocked to find out that ATSDR had come up with 548 Comparison Individuals for the in-utero study group, from the same base! Even after ATSDR officials repeatedly told CAP members that to do a credible study they did not need to use individuals from Camp Lejeune. Since I am a member of the CAP I thought it might be important for me to know about this group. What happened to trust and transparency? I provided GAO with documents to refute many of their statements. When the final draft came out I was surprised to see that they had not listened to very much of what I had to say. They had written a biased report in defense of the DoD and Marine Corps. I will be happy to dispel the rest of the GAO report with Congress at the upcoming hearing.

Mr. STUPAK. Dr. Gros.

STATEMENT OF MIKE GROS, M.D.

Dr. GROS. Good morning, Mr. Chairman, ladies and gentlemen of the committee. Thank you for inviting me to speak before you regarding the unfortunate water contamination issue which we have all heard about. My name is Michael L. Gros, M.D.

My involvement with this event spans the time period from July 1980 to July 1983 when I lived at H–57 MOQ and worked at the Naval Hospital as a staff Ob/Gyn physician. I provided in my written testimony a chronology of my dates of education and my qualifications.

I come before you as a representative of many individuals and families who were adversely affected over a 40-or-more-year time frame by contaminated water at Camp Lejeune. I am, unfortunately, well qualified by virtue of a harrowing and life-altering experience with non-Hodgkins lymphoma and its treatment involving a bone marrow transplant and the development of severe chronic graft versus host disease, from which I now suffer continuously.

My family and I moved to Camp Lejeune in July 1980 after finishing a Navy internship and residency at Naval Regional Medical Center in Portsmouth, Virginia. Ironically, we desired Camp Lejeune as a duty station, since it was stateside and, at the time, seemed safe for my family. Little did we know that quite the opposite was true. Unknown to us, Camp Lejeune had groundwater contamination, which we've discussed, with various organic chemicals such as trichloroethylene and perchloroethylene, among other chemicals, that may have originated as early as the 1950's. This was due to improper disposal of these agents used in machinery overhaul and improper location of wells in areas affected by seepage into the water table.

Our house at H–57 MOQ was supplied by the Hadnot Point water system. As noted in the table, acceptable levels of TCE are less than 5 parts per billion. Our house had 1,400 parts per billion and one well providing our water, and one well, number 651, had an astounding 18,900 parts per billion TCE when it was finally taken offline in 1985, 2 years after we left.

So, for all of our 3 years living at H–57, we were ingesting and inhaling this poisonous water and its vapor from showering and bathing. It's noted that the poisoning is even worse if the water is heated up because the materials volatilize easier than water boils. Our food and the baby formula and toddlers' Kool-Aid were mixed with the seemingly clean water.

This poisoning has no taste, it has no smell, and so it's undetectable by usual means. The cancerous effects do not appear until 10 to 15 years post-exposure, the so-called latency period which is noted in ATSDR's own documents. From 1980 onwards, Camp Lejeune's own documents revealed that routine water tests typically performed on chlorinated water systems looking for substances called trihalomethanes showed the presence of major contamination with other organic chemicals which required further action. Levels of these contaminants were so high so as to preclude THM testing. No records of any further action on Camp Lejeune's part exist. In fact, this THM testing was simply again repeated in intervals with similar results and, again, a shocking lack of further clarification.

Where was Camp Lejeune's concern for the safety of its residents? The technology involved in finding these poisons was readily available, but was either neglected due to incompetence or deliberately not done for unknown reasons. It is incomprehensible that this happened. Who made such bad decisions? Why was this ghoulish experiment performed on our military volunteers and their families? Such a failure to follow up on abnormal tests in my profession would have caused me to lose my medical license and, at best, face a malpractice suit I was sure to lose.

I'm sorry that I think like a doctor, but I feel people in charge of the welfare of others, such as managers of public water systems, should be held to standards of conduct commensurate with the serious nature of their jobs.

In spite of multiple handwritten warning notes on repeated test reports over several years' period of time, the advice of the base's outside water consultants to further identify and quantitate the poisoning chemicals was repeatedly ignored. Amazingly, no tests were ever done in follow-up to identify the nature of these compounds or their sources.

Even more incredible was the Marine Corps's attempt to later justify this gross neglect with the tack that no law existed requiring them to exercise the normal good judgment and caring that any other contemporary water supplier would have had for its customers. For example, the well 651 was not taken offline until 1985, 2 years after we left Camp Lejeune. Were we all unwitting lab rats? Such chemicals such as TCE and PCE are undetectable by usual taste and smell. So when we left active duty for Houston, Texas, in 1983, I was completely unaware that we had been systematically, unethically, and heartlessly poisoned during 3 years of living at Camp Lejeune.

I began a private practice of Ob/Gyn in Houston, Texas. Although I felt well, I began to show subtle lab abnormalities as early as 1993 and 1994. Definitely by 1997 these lab tests showed a marked shift in my complete blood count with an elevation of a lymphocyte fraction. To make a long story short, from 10 to 15 years removed from living at Camp Lejeune I had developed a slowly progressive and untreatable non-Hodgkins lymphoma called cutaneous T-cell lymphoma. My only treatment option would eventually be a bone marrow transplant when the disease reached such a point that my resistance to infection would be so low I could no longer see patients.

As I was seeing patients one day in November 1999, I was contacted out of the blue by Marie Sochia from the Agency for Toxic Substances and Disease Registry. She informed me that my younger son, Tom, conceived and born at Camp Lejeune, was to be studied as part of an in utero study due to his chemical exposure. This was my first knowledge of any toxic water in my former base. It was then that I made the connection between my disease and the TCE and PCE exposure which I had suffered during 3 years of continuous exposure at Camp Lejeune. My son seemed fine. However, I had progressive lymphoma.

I was happy to know that an infant study was to be done, but I was shocked to learn that there were no studies planned and no studies were felt to be warranted on the thousands of adults who were similarly exposed. I vigorously dispute this conclusion.

In May 2002, my disease had progressed to the point where I had dangerously low immunity and the lymphoma was replacing 50 percent of my bone marrow. I had to abruptly abandon my practice and be admitted for the only remaining chance of a cure, which was a bone marrow transplant. As many of you know, this is not a walk in the park. BMT carries a significant mortality risk related to acute and long-term complications. Thankfully, the procedures rather quickly put the lymphoma in remission, but unfortunately has left me with severe chronic graft versus host disease. The quality of my life has really degenerated as a result. Most of my ability to recreate and travel has been largely destroyed, and I can no longer tolerate much sun exposure or outside activity. But at least I'm still alive and kicking, and am finally here at long last to present this story to you all.

I have enclosed a list of most of the medical setbacks I have had over the last 5 years in the written testimony. My battle to stay healthy and out of the hospital has easily exceeded $4.5 million at this point in time. No telling what my total medical bills will amount to, but while I lay in bed in the aphaeresis unit for 4 hours at a time, getting my blood circulated in the photophaeresis apparatus, I have plenty of time to worry about how I'm going to stay alive and still avoid bankruptcy.

I was awarded 100 percent service-connected disability for my disease, but have found funding for anything other than pharmacy items to be very difficult to access at the VA hospital in Houston, Texas. I was forced to give away my practice at a great financial loss. Because of my need for chronic immune suppression, I will probably never be able to see patients again. All of the dedication and years of training I invested from the seventh grade onward have been wasted by a career cut short in its prime by this debacle.

My wife and I now have two new full-time careers, just staying alive and figuring out how to pay for it all.

I am here today to urge you to compel ATSDR, or preferably another truly impartial agency, to investigate the fates of those adults exposed as I was. I continue to receive phone calls from adults similarly exposed, suffering from lymphomas, who are just now finding out about this event. I am certain most of the hapless victims of this silent disaster are either dead or unaware that they are sick at an early age with cancer. They need help with their medical expenses and monitoring for future medical and possible developmental problems in their progeny.

This is not a faceless disaster. There are many people undoubtedly involved in the initial mismanagement and subsequent coverup of this entire event. There certainly has to be some credible explanation for at least the period in which my family was involved from 1980 to 1983.

There is a chain of command in the Navy and Marine Corps. Decisions surrounding management of the public water system on a Marine base are not made in a vacuum. A complete investigation needs to be initiated, with congressional oversight and congressional subpoena power as needed. Some victims even feel that possible criminal activity may have been involved.

The criminal investigation begun several years ago at the request of a number of victims and their families needs to be reopened. We also need to make sure this is not something akin to a version of the infamous Tuskegee experiment.

Members of the committee, I thank you for allowing me to speak before you today and I would be happy to answer any questions you might have.

Mr. STUPAK. Thank you.

[The prepared statement of Dr. Gros follows:]

TESTIMONY OF MICHAEL L. GROS M.D.

Good morning ladies and gentlemen of the committee, and thank you for inviting me to speak before you regarding the unfortunate water contamination issue involving the Marine base at Camp Lejeune, North Carolina.

My name is Michael L. Gros, M. D.

My involvement with this event spans the time period from July 1980, to July 1983, when I lived at H–57, MOQ and worked at the Naval Hospital as a staff Ob/Gyn. A brief chronology of my service dates is provided below:

- B. A. 1974, Trinity University, San Antonio, TX
- M.D. 1976, Baylor College of Medicine, Houston, TX, Navy Scholarship
- Internship and Residency in Ob/Gyn, 1976–1980, NRMC, Portsmouth, VA.
- Staff Ob/Gyn, July 1980-July1983, Camp Lejeune, N. C., LCDR, MC, USNR
- Private practice Ob/Gyn, 1983 to 2002, Houston, TX.
- Medically retired May 2002 to present due to Non-Hodgkins Lymphoma

I come before you as a representative of many individuals and families who were adversely affected over a forty or more year time frame by contaminated water at Camp Lejeune. I am unfortunately well qualified by virtue of a harrowing and life altering experience with Non-Hodgkins lymphoma and its treatment involving a bone marrow transplant (BMT) and the unfortunate development of severe chronic graft vs. host disease (GVHD) from which I now suffer, continuously.

My family and I moved to Camp Lejeune in July 1980, after I finished my U.S. Navy internship and residency in Ob/Gyn at NRMC, Portsmouth, VA. Ironically, we desired Camp Lejeune as a duty station since it was stateside and, at the time, seemed safe for the family. Little did we know that quite the opposite was true.

Unknown to us, Camp Lejeune had ground water and well water contamination with various volatile organic compounds such as trichloroethylene (TCE) and perchloroethylene (PCE), among other chemicals, that may have originated as early as the 1950's. This was due to improper disposal of these agents used in machinery overhaul and improper location of wells in areas affected by seepage into the water table. Our house at H–57 MOQ was supplied by the Hadnot Point water system. Acceptable levels of TCE are <5ppb. Our house had at least 1,400 ppb TCE (maybe higher), and one well, No. 651 in the Hadnot Point field had an astounding 18,900 ppb TCE when finally taken off line 1985, two years after we left.

So for all of our three years living on base at H–57 MOQ we were ingesting and inhaling this poisonous water and its vapor from showering and bathing (worse when heated up). Our food and the baby's formula and toddler's Kool Aid were mixed with this seemingly clean water. This poisoning has no taste and no smell and so is undetectable by usual means. The cancerous effects do not appear until 10–15 years post exposure (latency period noted in ATSDR documents).

From 1980 onwards, Camp Lejeune's own documents reveal that routine water tests typically performed on chlorinated water systems (trihalomethanes, THM) showed the presence of major contamination from other organic compounds requiring further action. Levels of these contaminants were so high as to preclude THM testing. No records of any further action on Camp Lejeune's part exist. In fact, this THM testing was simply again repeated at intervals with similar results and again a shocking lack of further clarification. Where was CLNC's concern for the safety of its residents?

The technology involved in finding these poisons was readily available, but was either neglected due to incompetence or deliberately not done for unknown reasons. It is incomprehensible that this happened. Who made such bad decisions? Why was this ghoulish experiment performed on our military volunteers and their families?

Such a failure to follow up on abnormal tests in my profession would have caused me to lose my medical license or at best, face a malpractice suit I was sure to lose. I am sorry that I think from a doctor's perspective, but I feel people in charge of the welfare of others, such as managers of public water systems, should be held to standards of conduct commensurate with the serious nature of their jobs.

In spite of multiple handwritten warning notes on repeated test reports over several years period of time, the advice of the base's own outside water consultants to further identify and quantitate the poisoning chemicals was repeatedly ignored. Amazingly, no follow up tests were ever done to even identify the nature of the interfering chemicals or their sources. Even more incredible was the Marine Corp's attempt to later justify this gross neglect with the tact that no "law" existed requiring them to exercise the good judgment and caring that any other contemporary water supplier would have had for its customers. For example, the horribly polluted well, No. 651, (drilled next to the dump!) was not taken off line until 1985, two years after we left Camp Lejeune. Were we all unwitting lab rats?

Since chemicals such as trichloroethylene and perchloroethylene are undetectable by the usual modes of taste and smell, when I left active duty to move to Houston, Texas, I was completely unaware that we had been systematically, unethically, and heartlessly poisoned during our 3 years at Camp Lejeune.

I began a private practice in Ob/Gyn in Houston, TX. Although I felt well, I began to show subtle lab abnormalities as early as 1993 and 1994, and definitely by 1997, these lab tests showed a marked shift in my complete blood count with an elevation of lymphocytes. To make a long story short, from 10–15 years removed from living at Camp Lejeune, I had developed a slowly progressive and untreatable Non-Hodgkins lymphoma called Cutaneous T-Cell lymphoma (CTCL), otherwise known as *mycosis fungoides*.

My only treatment option would eventually be a bone marrow transplant when the disease reached such a point that my resistance to infection would be so low that I could no longer see patients.

As I was a seeing patients one day in November 1999, I was contacted out of the blue by Marie Sochia from the Agency for the Toxic Substance and Disease Registry (ATSDR). She informed me that my younger son, Tom, conceived and born at Camp Lejeune, was to be studied as part of an "in utero" study, due to his chemical exposure at Camp Lejeune. This was my first knowledge of any toxic water at my former base.

It was then that I made the connection between my disease and TCE and PCE exposure, which I had suffered during three years of continuous exposure at Camp Lejeune, North Carolina. My son seemed fine. However, I had progressive lymphoma. I was happy to know that an infant study was to be done, but I was shocked to learn that no studies were felt by ATSDR to be warranted on the thousands of exposed adults. I vigorously dispute this conclusion.

In May 2002, my disease had progressed to the point where I had dangerously low immunity with the lymphoma replacing fifty percent of my bone marrow. I had to abruptly abandon my practice and be admitted for my only remaining chance at a cure, a bone marrow transplant (BMT).

As many of you know, this is not a walk in the park. BMT carries a significant mortality risk related to acute and long-term complications. Thankfully, the procedure rather quickly put the lymphoma in remission, but, unfortunately, has left me with severe chronic graft versus host disease. The quality of my life has really degenerated as a result. Most of my ability to recreate and travel has been largely destroyed. I can no longer tolerate much sun exposure or outside activity. But at least I am still alive and kicking and am finally here at long last to present this story to you all.

Here is a list of most of the major medical setbacks I have endured over the last 5 years:

- Graft versus host disease of liver, lungs, skin, eyes, gastrointestinal tract
- Pneumonia-bacterial
- Pneumonia-Pneumocystis carinii
- Cellulitis
- Acute and chronic renal failure
- Cataracts—both eyes
- Diabetes
- Heart failure

- Gastroenteritis
- Toxoplasmosis of the brain
- Squamous cell carcinoma of the skin
- Osteopenia
- Baldness
- Depression
- Hearing loss secondary to medications
- Anemia
- Fatigue
- Septicemia from a central line

My battle to stay healthy and out of the hospital has easily exceeded $4½ million at this point in time. No telling what my total medical bills will amount to, but while I lay in bed in the aphaeresis unit for 4 hours getting my blood circulated in the photophaeresis apparatus, I have plenty of time to worry about how I am going to stay alive and still avoid bankruptcy.

I was awarded 100 percent service connected disability for my disease, but have found funding help for anything other than pharmacy items to be very difficult to access at the V.A. hospital in Houston, TX.

I was forced to give away my practice at a great financial loss. Because of my need for chronic immune suppression, I will probably never be able to see patients again. All of the dedication and years of training I invested from the seventh grade onward have been wasted by a career cut short in its prime by this debacle.

My wife and I now have new full time careers—just staying alive and figuring out how to pay for it all.

I am here today to urge you to compel ATSDR, or preferably another truly impartial agency, to investigate the fates of those adults exposed as I was. I continually receive phone calls from adults similarly exposed, suffering from lymphomas, yet just now finding out about this event. I am certain most of the hapless victims of this silent disaster are either dead or unaware why they are sick at an early age with cancer. They need help with their medical expenses and monitoring for future medical and possible developmental problems in their progeny.

In my opinion, there is an ongoing coverup involving this disaster, and ATSDR may well be "running the point" for the responsible governmental agencies or chemical manufacturers. The absence of relevant documents showing any reasonable chain of responsibility, combined with the trumped up and utterly unbelievable attempts at public relations put out by the Marine Corps, are very telling in this regard. Instead of wisely spending the tax payors money finding and assisting all those exposed to this chemical cocktail, the Marine Corp has seen fit to hire a public relations and strategy firm (Booze Allen Hamilton) to arrange misleading town meetings, whose predetermined exculpatory findings insult our intelligence. It seems no one is responsible for any of this man-made disaster. Ladies and gentlemen, I do not believe any of this rubbish.

This is not a faceless disaster. There were many people undoubtedly involved in the initial mismanagement and subsequent cover up of this entire event. There certainly has to be some creditable explanation for at least the period in which my family was involved from 1980 to 1983. There is a chain of command in the Navy and Marine Corps. Decisions surrounding management of a public water system on a Marine base are not made in a vacuum.

A complete investigation needs to be initiated with congressional oversight and congressional subpoena power as needed. Some victims even feel that possible criminal activity may have been involved. The criminal investigation begun several years ago at the request of a number of the victims and their families needs to be reopened. We also need to make sure this is not something akin to a version of the infamous Tuskegee experiment.

Members of the committee, I thank you for allowing me to speak before you today. I would be happy to answer any questions you might have.

Mr. STUPAK. Mr. Ensminger, your opening statement, please, sir.

STATEMENT OF JEROME ENSMINGER

Mr. ENSMINGER. Good morning. My name is Jerry Ensminger, and I served my country faithfully for 24½ years in the United States Marine Corps.

I would like to take this opportunity to thank the chairman, the committee members and their staffs for all the hard work that went into making these hearings possible.

I must say that it has been inspiring for me to have tuned in to C-SPAN these last several months and witnessed our Congress doing what our Founding Fathers intended. You have been taking on the tough issues that matter to the majority of our citizens, not just the issues that affect special interest groups and big business. And I am quite sure most Americans applaud you for your efforts.

I am appearing here today as one spokesperson for the hundreds of thousands of Marines, sailors, their families, and the loyal civilian employees who were unknowingly exposed to horrendous levels of toxins through their drinking water at Camp Lejeune, North Carolina.

Camp Lejeune is quite possibly one of, if not the worst, water contamination incidents in history. I can confidently make this claim based on the potential numbers of people who were exposed and the documented levels of contaminants that were present in the finished drinking water at this base. Ironically, most of these people still do not have any idea that they were exposed to these contaminants at Camp Lejeune. They have not been notified, and the United States Marine Corps has to date refused to institute any type of legitimate notification plan or policy.

I can assure you that there are many more individuals and families who are now literally spread out all over this country, if not this world, that are wondering, what happened to me, "What happened to my family member?" these people deserve an answer. It is time for the United States Marine Corps to live up to our motto, which is *Semper Fidelis*, which is Latin for "always faithful."

My daughter Janey was conceived while her mother and I lived in one of the base family housing units that was affected by the contaminated drinking water at Camp Lejeune. Just like our other children, Janey was born seemingly normal; that is, until she was diagnosed with acute lymphocytic leukemia at the age of 6.

In 1997, the Agency for Toxic Substances and Disease Registry, or ATSDR, proposed a childhood leukemia/non-Hodgkins lymphoma study for children exposed to VOCs in utero while their parents lived at Camp Lejeune between the years of 1968 and 1985. The proposal, which was sent to the Secretary of the Navy, stated that the expected occurrences of these illnesses in a group of 10,000 to 12,000 births for that same time period was 7.2 cases. ATSDR has now already confirmed 14 cases of leukemia and two cases of childhood non-Hodgkins lymphoma out of 12,598 respondents to their survey. This is more than a 100 percent increase in the instances of these childhood cancers.

Mr. Chairman, the bottom line is this: DoD officials had been repeatedly notified by three different analytical laboratories over a span of 4.5 years about the existence of these chemicals in Camp Lejeune's finished drinking water. One laboratory wrote a letter on August 10, 1982, to Camp Lejeune's commanding general, telling him that the high levels of chemicals that they had found in their water were more important from a health standpoint than what they had sent their water to be tested for in the first place, which was TTHMs.

DoD authorities took no action to identify the source of these chemicals in their water for 4.5 years following their discovery. We have discovered documents where DoD representatives have admitted that the ATSDR had incorrect water system data for Camp Lejeune.

Ms. Kelly Dreyer of Headquarters Marine Corps wrote a 16 November 2000 e-mail to a Mr. Neil Paul at Camp Lejeune's Environmental Management Department citing the incorrect data and directing its correction. Ms. Dreyer wrote in her e-mail that it was important that we set the record straight. She asked Mr. Paul to prepare a memorandum to the ATSDR with all of the correct information, and placed a 1 December 2000 deadline for its completion. Then I discover another e-mail from Ms. Dreyer, dated 16 March 2001, 4 months later; this time to a Mr. Rick Raines, a subordinate of Mr. Paul's at Camp Lejeune, repeating the very same request.

This information was related to the incorrect water system data which caused the ATSDR to overlook more than 1,500 babies in an earlier study. We now know that the memorandum never got written. ATSDR never found out that they had been provided incorrect water system data for Camp Lejeune until I informed Dr. Frank Bove in a telephone conversation in 2002.

The credit for the discovery of the incorrect water system data belongs to Major Tom Townsend, United States Marine Corps (retired). He now lives in Moscow, Idaho. It was through Major Townsend's diligent and aggressive letter writing and Freedom of Information Act request campaign that much of the factual information about Camp Lejeune was uncovered. Major Townsend lost an infant son and, more recently, his wife of more than 50 years to this contamination.

Over the nearly 10 years that I have been involved in this situation, I have had much interaction with the various DoD personnel who have been involved in this situation. While some have been understanding, others have been just as, if not more, hurtful and arrogant.

During the 1990's and early 2000's, there have been, in my estimation, multiple violations of the CRCLA and RCRA laws in regards to Camp Lejeune. It is suspected that 6 years ago the United States Environmental Protection Agency granted our Department of Defense the authority not to list anymore of their contamination sites on the national priority list. I must also assume that this was executed with the full blessing of the Bush administration, or else the EPA's decision would have been overturned.

There is something that a lot of Americans do not understand. The United States Department of Defense is our Nation's largest polluter. Prior to the EPA granting authority, DoD had 172 highly contaminated sites on the national priority list. I realize that it is of the utmost importance that we maintain a strong defense. I also understand firsthand what happens if we do not maintain our environment at the same time. What will we have left to defend? A toxic waste dump.

Yes, our Department of Defense should be held to the same standards as every other industry in our Nation. The Department of Defense would not tell the truth about their own accidental killing of our own soldiers in a combat zone; i.e., Pat Tillman. What makes anyone believe that they would not lie about the contamination on their installations right here in the United States?

My daughter Janey lost her battle against her malignancy nearly 2½ years after it started. Janey went through hell, and all of us who loved her, we went through hell with her. Janey died at 3:35 p.m. on 24 September 1985. She was only 9 years old.

Thank you, Mr. Chairman.

Mr. Chairman, I would like to share with the committee the dialog of a telephone conversation I had recently with someone from headquarters Marine Corps.

Mr. STUPAK. Go ahead.

Mr. ENSMINGER. On the 10th of April I called Headquarters Marine Corps to find out what happened to the funding for the National Academy of Sciences review, funding that was authorized by the defense authorization bill, and I got Ms. Kelly Dreyer on the phone, and we were discussing this and several other issues. And Ms. Dreyer accused me of having a lot of pent-up anger. I couldn't believe that she said that.

But I recounted to Ms. Dreyer, and the fact that she's a mother, what I went through as a parent through the illness of my daughter. I informed her of the shock that happens to a parent when their child's diagnosed with one of these catastrophic illnesses. I had to have letters written so that I could attain a humanitarian transfer so my daughter could be transferred to Penn State University Medical Center where my home's at, where my family was for support. And one of the doctors wrote a letter and I read it, and it said at her diagnosis, her white blood count was over 150,000, which put her in a high-risk category and limited the ability or the chances that she would have long-term survival.

I lived that nightmare every day from the time I saw that letter. Every day that entered my mind. And then I reminded Ms. Dreyer about what she went through in the treatment rooms. Every time she got stuck with a needle, I was there holding her. She was screaming in my ear. Every time they stuck a needle through her bone in her hip to pull out bone marrow, I held her and she screamed in my ear, "Daddy, "Daddy, don't let them hurt me." And the only thing that I could say to her was, "Honey, the only reason they're hurting you is they're trying to help you."

And then I reminded Ms. Dreyer about every time Janey got hit with chemotherapy, and she was heaving her guts out, and all I could do was stand and rub her back and soothe her.

And then when Janey came home from school, when she could finally go back to school, crying because the other kids at school picked on her because her treatments made her look like a freak.

And then on the day of her death, I started crying. I hadn't cried in front of Janey before that time because she was pulling her strength from me. And I had to be strong for her. If I had to cry, I went somewhere else. But that day I started crying, and she looked up at me, and she had pneumonia that bad she could hardly talk, but she said, "Stop it." and I said, "Stop what?" she said, "Stop crying, Daddy. I love you."

That was the last words my daughter said to me. She went into a coma. Thirty-five minutes later, she took her last breath, and I since that conversation with Ms. Dreyer I have thought about that statement she made to me. And you know what? Through these people's misconduct and their deceit, they haven't filled me with a lot of pent-up anger. What they have filled me with is a terrible resolve to expose their misconduct, their arrogance, and their incompetence. And I want to expose the truth.

Thank you.

Mr. STUPAK. thank you for your testimony.

[The prepared statement of Mr. Ensminger follows:]

TESTIMONY OF JEROME M. ENSMINGER

Good morning, my name is Jerry Ensminger and I served my country faithfully for 24½ years in the United States Marine Corps. I would like to take this opportunity to thank the chairman, the committee members, and their staffs for all of the hard work that went into making these hearings possible. I must say that it has been inspiring for me to have tuned into C-SPAN these last several months and witnessed our congress doing what our founding fathers intended. You have been taking on the tough issues that matter to the majority of our citizens, not just the issues that affect special interest groups and big business. I, and I am quite sure most Americans, applaud you for your efforts.

I am appearing here today as one spokes person for the hundreds of thousands of Marines, Sailors, their families, and the loyal civilian employees who were unknowingly exposed to horrendous levels of toxins through their drinking water at Camp Lejeune, N.C. Camp Lejeune is, quite possibly, one of , if not the worst, water contamination incidents in history. I can confidently make this claim based on the potential numbers of people who were exposed and the documented levels of contaminants that were present in the finished drinking water at the base. Ironically, most of these people still do not have any idea that they were exposed to these contaminates at Camp Lejeune. They have not been notified and the United States Marine Corps has to date refused to institute any type of legitimate notification plan/policy. I can assure you that there are many more individuals and families who are now literally spread out all over the country that are wondering, "What happened to me?" "What happened to my family member?" These people deserve an answer. It is time for the United States Marine Corps to live up to their motto "Semper Fidelis" which is Latin for "Always Faithful."

My daughter Janey was conceived while her mother and I lived in one of the base family housing units that was affected by the contaminated drinking water at Camp Lejeune. Just like our other children, Janey was born seemingly normal, that is until she was diagnosed with Acute Lymphosytic Leukemia at the age of six. In 1997, the Agency for Toxic Substances and Disease Registry (ATSDR) proposed a childhood Leukemia /Non-Hodgkins Lyphoma study for children exposed to VOCs in-utero while their parents lived at Camp Lejeune between the years 1968-1985. The proposal (CLW 2815-2832) which was sent to the Secretary of the Navy, stated that the expected occurrences of these illnesses in a group of 10,000–12,000 births for that time period was 7.2 cases. ATSDR has now confirmed 14 cases of leukemia and two non-hodgkins lymphoma out of 12,598 respondents to their survey. This is more than a 100 percent increase in the incidence of these childhood cancers.

On October 1, 1980, representatives from Navy Facilities Engineering Command, Atlantic Division from Norfolk, VA. Came to Camp Lejeune. They took a composite water sample of all eight water systems that were operating on Camp Lejeune at that time. The results of this composite sample (CLW 0430) showed VOC contamination that exceeded today's Maximum Contaminate Level (MCL) of 5ppb. We must remember that this was composite (combined) sample of which 6 of the contributing water systems were not deemed to be contaminated. Ms. Elizabeth Betz, Supervising Chemist at Camp Lejeune's Quality Control Laboratory wrote a memorandum (CLW 0613) dated 31 August 1982 that specifically addressed the 1 October 1980 sampling event. First and foremost, the analytical results for this sample were not provided to Camp Lejeune until 12 August 1982 and Ms. Betz points out errors that were committed during the sample collection process. Also, during October of 1980 the United States Army Environmental Hygiene Team from Fort McPhearson, GA. Began testing certain water systems aboard Camp Lejeune for total Trihalomethanes (TTHMs). Their analysis of the 30 October 1980 water samples taken form the Hadnot Point Water Distribution System had the following hand written remark: "Water is highly contaminated with low molecular weight halogenated hydrocarbons." (CLW 0436) On 29 December 1980 another sample was taken from the Hadnot Point system and again the U.S. Army laboratory wrote a note on the analytical form, Heavy organic interference at CHCL2BR. You need to analyze for chlorinated organics by GC/MS. (CLW 0438) Once again samples were taken of the same system on 30 January 1981 and the U.S. Army laboratory wrote on the analytical result form You need to analyze for chlorinated organics by GC/MS (GC/MS is an abbreviation for Gas Chromatograph / Mass Spectrometer.) Finally, on 9 March 1981 more samples of Hadnot Point water system were collected and analyzed. The U.S. Army laboratory once again wrote a note at the bottom of the analytical result form Water highly contaminated with other chlorinated hydrocarbons (solvents)! (CLW 0443) These analytical result forms were being sent by the U.S. Army directly to the Navy Facilities Engineering Command, Atlantic Division, Norfolk, VA. No action was taken. In fact, officials at Camp Lejeune were unaware of the U.S. Army's finding until the Summer of 1982. When the EPA's MCLs for TTHMs went into effect in 1982, Camp Lejeune was required to use a North Carolina state certified laboratory for the analysis of their water. Grainger Laboratories of Raleigh, N.C. was contracted by Camp Lejeune to analyze their water samples. In May 1982, a Grainger laboratory representative phoned Ms. Betz of Camp Lejeune and informed her that they had found high levels of Volatile Organic Chemicals (VOCs) during their analysis of the Hadnot Point and Tarawa Terrace water systems. They had a problem with some of the sample bottles and they requested that Camp Lejeune take new samples. On 10 August 1982, Mr. Bruce A. Babson, a chemist with Grainger laboratories, wrote a letter to the Commanding General of Camp Lejeune. (CLW 0592,0593) In his letter Mr. Babson stated "Interferences which were thought to be chlorinated hydrocarbons hindered the quantitation of certain trihalomethanes. These appeared to be at high levels and hence more important from a health standpoint than the total Trihalomethane content. For these reasons we called the situation to the attention of Camp Lejeune personnel." Mr. Babson went on in his letter to describe the levels of the chemicals they had found in the samples. Tetrachloroethylene (PCE) 104 ppb in the Tarawa Terrace (TT) sample and Trichloroethylene (TCE) 1,400 ppb in the Hadnot Point sample. There was absolutely no action taken by Camp Lejeune officials after they received this warning. On 19 August 1982, Ms. Betz wrote another memorandum (CLW 0606-0607) to Mr. Sharpe, Supervisory Ecologist, Environment Section. In her memorandum Ms. Betz outlines the Grainger laboratory results and she also discusses the EPA suggested no adverse response levels (SNARLS) for the chemicals found in Camp Lejeune finished drinking water. In paragraph 8 of her memo Ms. Betz writes that the levels of PCE for the Terawa Terrace system exceed the EPA's guidance. In fact, they were more than doubled. Grainger laboratories continued to test Camp Lejeune's finished drinking water for TTHMs throughout 1982-1983 and each time they detected high levels of VOCs. They contacted Camp Lejeune and they annotated it on their analytical result form. (CLW 0693, 0953) No action was taken!

In 1982 the U.S. Navy began their Navy Assessment and Control of Installation Pollutants (NACIP) Initial assessment study (IAS) of Camp Lejeune. This program was started in 1980 by the U.S. Navy to identify any possible "Love Canals" at any Naval shore installations (CLW 4994). The NACIP IAS was completed for Camp Lejeune and they issued their report in April 1983. The general finding of the NACIP IAS report stated in paragraph 2.2.2 "Seventy six waste disposal sites have been identified; however, most (54) do not contain hazardous waste or do not pose a significant threat to human health or the environment.' and 2.2.4 "No industrial or municipal wastes were found to be migrating onto base property." I would like to know how these "experts" came to this conclusion. Did they take water samples from the groundwater aquifers or did they make this assumption from a quick drive around the boundary of the base? Camp Lejeune officials, quick to seize on this IAS report, wrote a letter to the State of North Carolina, Division of Health Services, Solid and Hazardous Waste Management Branch (CLW 0948). In their letter to the state, a Camp Lejeune official wrote "The study concludes that none of the 76 sites pose an immediate threat to human health or the environment," There is quite a big difference in the definition of the words "most" and "none" , especially when they are used in reference to hazardous waste sites and human health! There are some very pertinent questions about the NACIP IAS that remain unanswered. Did Camp Lejeune inform the NACIP IAS team that VOCs had already been detected in their finished drinking water? Did the NACIP IAS team ask for existing analytical results of Camp Lejeune drinking water when they inspected the water treatment plant? The NACIP IAS was on-going when Camp Lejeune received the 10 August 1982 letter (CLW 0592) from Grainger Laboratories. Did Camp Lejeune provide this letter to the NACIP/IAS team? It would be my guess that none of this information was shared with the NACIP IAS team. I make this assertion based on a letter dated October 25, 1985 from the State of North Carolina to Mr. Larry Fitzpatrick. The attachment to this letter was an assessment written by Mr. Rick Schiver of N.C.s Department of Environmental Management concerning the groundwater contamination at Camp Lejeune. In his assessment, Mr. Schiver wrote "During July 1984, confirmation studies were begun at eighteen (18) priority sites. The results of these groundwater studies were documented in a report provided to the Marine Corps in February 1985: as the Marine Corps disagrees with the conclusion in this report, it will not release a copy of it to any outside agency. It is my estimation that when the NACIP team came back to Camp Lejeune in July 1985, officials at the base, realizing that the NACIP confirmation study would reveal the existing groundwater contamination, they informed them of the existing analytical results. It is my opinion that the NACIP team was both professionally embarrassed and appalled by the fact that this information had been available during their IAS of the base in 1982. They had neither asked for it and worse, Camp Lejeune officials concealed the information from them. I suspect that the NACIP team wrote a scathing confirmtion study report about Camp Lejeune. No one with whom I have personally spoken, has seen this report. It is imperative that Congress obtain a copy of this original report. I believe that it is the smoking gun in relation to the drinking water contamination at Camp Lejeune.

As stated previously, the NACIP Confirmation study began in July 1984 (Note: The U.S.E.P.A. issued RMCLs for VOCs in June 1984) and they began testing the individual water supply wells in October. The results of these samples began to trickle back in during November and December of that year. It was more than 4 years after the initial discovery of VOCs in Camp Lejeune's finished drinking water before they took any action to remedy the situation. During the months of November and December of 1984, Camp Lejeune removed (7) contaminated water supply wells from service in the Hadnot Point system. In January 1985, the Chief of Staff's wife smelled fuel in the tap water at their quarters on Paradise Point officers' housing area. This housing area was served by the Holcomb Blvd. water treatment plant since August 1973. (Note: Remember this water system and date; it becomes very important later in time) Camp Lejeune maintenance workers discover that an emergency back-up generator fuel line had burst, allowing fuel to enter the water system. The Holcomb Boulevard plant was immediately taken off line and this area was provided Hadnot Point water via an existing inter-tie between the two systems. Camp Lejeune officials notified N.C. state health and environmental authorities of the accidental contamination. After thoroughly flushing the Holcomb Boulevard system with Hadnot Point water, military and N.C. state authorities began testing the water to ensure that the fuel had been sufficiently flushed out of the system. What they found was worse! At the Berkley Manor Elementary School they found Trichloroethylene (TCE) at 1,148.4 ppb and Dichloroethylene (DCE) at 406.6 ppb. (CLW 2254) This is when well No. 651 of Hadnot Point water system was discovered. This well was located at the back corner of Lot No. 203, the Defense Revitalization Management Office yard; (The base junk yard!) (Note: Well No. 651 was constructed in 1971, 30 years after operations began at Lot No. 203). This well tested at 18,900 ppb of Trichloroethylene (TCE) and 655 ppb of Vinyl Chloride during early February 1985 testing. It should be pointed out that well No. 651 was the only contaminated well that was still pumping during the January, February 1985 time frame. This one contaminated well caused finished drinking water samples to exceed the 1,000 ppb for TCE alone. One can only imagine what the levels of contaminates were prior to the November/December 1984 time frame when several of these contaminated wells would have been pumping at the same time. Hopefully, the ATSDR's on-going computerized water modeling will answer that question. During this same time frame, the water system for the Tarawa Terrace (TT) base family housing area was found to be contaminated with high levels of Tetrachloroethylene (PCE). It should be pointed out at this time that the highest contaminated water supply well for TT (TT—26 @ 1,580 ppb PCE) was constructed at the property line. TT's well field was constructed down gradient and directly across the street from a dry cleaning establishments, gasoline stations, automotive repair facilities, and known septic sewage ground absorption systems.

On 11 March 1985, Mr. Julian Wooten, Director of Camp Lejeune's Natural Resources and Environmental Affairs Division wrote what I can only describe as a C.Y.A. letter. (CLW 1179-1180) In his letter, Mr. Wooten explained, in remarkable detail, the recommendations of, and the sources contacted (and not) by Mr. Hubbell. My only regret about this letter is that Mr. Wooten concurred with Mr. Hubbell's recommendations. (See paragraph No. 3, CLW 1180) Mr. Wooten was a personal friend of mine. When I discovered this letter, I was greatly disheartened and disillusioned by his actions (or lack there of). I lost a lot of respect for this man. It is quite obvious that these authorities were playing a selective game of Ostrich; put your head in the sand and do not look back where you know the damming Information lies. That way if all of this comes up later, they can say, “We did not know any better.” This is the exact tactic that has been employed by the D.O.N. and the USMC ever since this situation truly became public in 1997. Mr. Wooten retired in the 1990s; Mr. Hubbell holds a flag rank civilian Position at HQMC. His biography can be viewed on the USMC’s official Web site *www.usmc.mil* General officer biographies.

On October 4, 1989, (CLW 4976) Camp Lejeune was placed on the National Priority List (NPL) for contamination sites. This appointment automatically required the ATSDR to execute their Congressionally mandated mission and perform an assessment at Camp Lejeune for human exposures to the contamination. Initially, the USMC provided information to the ATSDR (see PHA for Camp Lejuene) and the public about the Tarawa Terrace Hadnot Point and Holcomb Blvd. service areas that was incorrect and blatantly untrue! When the ATSDR began their assessment of the contamination at Camp Lejeune, there were several letters written requesting data on the water systems and the contamination sites on the base. On February 23, 1993, Ms. Nancy L. Sonnenfeld of the ATSDR’s Epidemiology and Surveillance Branch Wrote a letter to Mr. Neal Paul of CLNC, Environmental Management Department (CLW 2245, 2246). In her letter, Ms. Sonnenfeld explained exactly what information / data the ATSDR was looking for, drinking water distribution systems data. I would like to point out the statement made by this scientist at the beginning of paragraph No. 3 in this letter. It is my opinion that statements such as these are considered pandering and gives the impression that the ATSDR is willing to play on both sides of the fence! While I did obtain this letter, none of the enclosures have ever been made public. A letter written to CLNC on March 5, 1993 (CLW 2247) ATSDR environmental engineers were requesting copies of site related materials appropriate for the preparation of public health assessments. The author of this letter, Mr. Stephen S. Aoyama, P.E. was very thorough in his request. Please note the hand-written comments that were made on the letter at CLNC. “Final Reports Only—Send 2 or 3 Final R1/FS.” This was not what ATSDR asked for; this was a deliberate stalling / harassment tactic. Then, on September 2, 1994 (Note: 6 days prior to their initial release of the Camp Lejeune PHA) the ATSDR’s Office of Assistant Administrator wrote a letter to the Engineering Support Department, Navy Environmental Health Center (NEHC), Norfolk, VA. (CLW 2407) This letter states “We have sent MCB, Camp Lejeune several requests for information and, in most cases, the responses were inadequate and not supporting documentation was forwarded.” (Note: All of the handwritten notes were on this letter when it appeared on the PDF file. (Please note the “knee jerk” comment at the lower left.) Then I find a letter from the Commanding Officer of the NEHC (CLW 2406) a subordinate command to CLNC “recommending” that they cooperate with the ATSDR and provide them with the requested data. Please note that higher headquarters was copied on this letter and the enclosure. I have found no documented involvement from higher headquarters where they chastised CLNC authorities for their lack of cooperation with the ATSDR. The fact that there is no documented corrective action from any of the higher headquarters is a clear signal that they complied with and were party to the tactics being employed by CLNC in this situation. I have found many data requests (in writing) from the ATSDR. I have never found any written submissions of data to the ATSDR from CLNC, not one! We have submitted Freedom of Information Act (FOIA) requests to the ATSDR and the USMC for any and all documents pertaining to data submissions from CLNC to the ATSDR. None of these FOIAs have ever been fulfilled. In fact, the Director of the ATSDR sent me a letter dated 4 May 2007 that his agency can not produce the supporting documents for their 4 August 1997, PHA of Camp Lejeune. Dr. Frumkin stated that all of these reference documents had been “mistakenly” destroyed by a private contractor? It would be interesting to find out how many other N.P.L. sites P.H.A. supporting Documents have been lost or destroyed by this agency or is it only the Camp Lejeune documents?

At the same time the ATSDR was conducting the PHA for Camp Lejeune, (1992–97) the ATSDR proposed an adverse pregnancy outcome study for the years 1968–1985. (CLW 2528–2529) This study was conducted and it became the basis for the Camp Lejeune Health Survey (1999–2003) and the epidemiological study that is still in progress. There is a problem with the findings of this initial study. Camp Lejeune officials provided the ATSDR with incorrect water system/distribution data for the Holcomb Blvd. and Tarawa Terrace service areas. The ATSDR had been led to believe that the Holcomb Blvd. water service area had received their drinking water from the Holcomb Blvd. water treatment / distribution plant. This water treatment plant was not constructed until 1972 and the Camp Lejeune Plant Account records show it as becoming operational in August 1973. (CLW 3238) Prior to 1973, the base family housing in this area, Berkley Manor, Paradise Point, and Midway Park, received their water from the presumed contaminated Hadnot Point system. Furthermore, CLNC officials misled the ATSDR and the public to believe that when the 2 wells in the Tarawa Terrace (TT) system had been taken off line because of contamination, they shut the entire TT water distribution system off. They proclaim in many documents (CLW 3075, 3076, 3077, 3161) that without the production from those two contaminated wells, the TT plant could not meet the water demand. Since 1985 TT received their water from the Holcomb Blvd. system. We know that this was not the truth, the Tarawa Terrace water system stayed in production and online until March 1997. Because of the incorrect information for the Holcomb Blvd. service area an estimated 1,500 pregnancies were overlooked in the 1968–1985 "Adverse Pregnancy Outcome" study. I have no idea how many babies were excluded because of the erroneous data on TT. We also know from internal USMC documents that Camp Lejeune officials turned on one of the known contaminated TT wells to meet water demand during peak demand periods. (CLW 1132) An action bried (CLW 1129—1131) written by the Assistant Chief of Staff Facilities on 1 March 1985 outlined the alternatives for providing water to the Tarawa Terrace (TT) base housing area. The USMC constantly states that their highest priority is the Health and welfare of their Marines, Sailors, their families, and the civilian employees on their bases. I can assure you that this document, and the alternatives that we now know were chosen, do not support those claims. According to the alternatives that we now know were selected from this document, health and welfare took a back seat to money and favors. In 1999, Major Tom Townsend, USMC (Retired) began a very aggressive letter writing / FOIA campaign. His intent was to procure as much information pertaining to the situation as he could. It was Tom Townsend who, in 2000, discovered the incorrect water system data for the Holcomb Blvd. service area for the years of 1968–1973. He immediately notified USMC officials (in writing) of the error. On 16 November 2000, Ms. Kelly Dreyer, Project Officer, Camp Lejeune Water Contamination, Installations and Logistics Branch, Headquarters Marine Corps (HQMC) sent an e-mail to Neal Paul at CLNC, EMD. In her email Ms. Dreyer outlined the incorrect water system data situation to Mr. Paul. She told him that it was "important to set the record straight" and she wanted him to write a memorandum to ATSDR with the correct information. Ms. Dreyer went on to spell out in detail what information she wanted on the memo and gave him a "by date" for completion and signature of 1 December 2000. She also directed that the Commandant of the Marine Corps and the NEHC be copied. Four months later, March 16, 2001, Ms. Dreyer sends another e-mail to CLNC, EMD requesting the very same information. (CLW 3307) The only difference is that this time she addresses her request to Mr. Rick Raines, a subordinate of Mr. Neal Paul who received the first directive. Needless to say, this memorandum was never written. The ATSDR never knew they had incorrect water system data until I told Dr. Frank Bove During a telephone conversation in 2002. The USMC had corrected their error by placing a new entry on their chronology which is located on their official Web site. The USMC never informed the ATSDR that their "Adverse Pregnancy Outcome" study had been skewed by the incorrect water system data. What is just as appalling is the fact that the USMC did not correct this error knowing full well that the ATSDR was well into their Childhood Cancer and Birth Defects study. Had it not been for Tom Townsend's diligence, this lie may never have been uncovered. The lies about the Tarawa Terrace water system were never rectified. It is unknown how many babies that were exposed to these contaminates have been overlooked by the ATSDR's studies.

When the ATSDR announced their proposal for a Childhood Cancer study on June 23, 1997 (CLW 2815) it caused a firestorm of lies and deceit amongst the USMC and DoN spin doctors. When any press interviews or press releases were issued concerning the Camp Lejeune water contamination, they always pointed to the Tarawa Terrace base housing area. This was because they had an off-base scapegoat on which to focus the attention of the media and the public. When the ATSDR went to the Secretary of the Navy to acquire funding for their proposed Childhood Cancer study in 1997, Ms. Elsie Munsell wrote a letter to the ATSDR. (CLW 2917) In her letter, Ms. Munsell wrote "the volatile organic chemicals found in the water supply under investigation came from an off base source, ABC One Hour Cleaners. According to our investigation, this off site source of contamination is a National Priorities Listed Site under the jurisdiction of the EPA. Therefore, in accordance with CERCLA 107(a), it is more appropriate for you to seek funding for the study from the responsible party." The USMC /DoN's incorrect water system data had worked wonders for them thus far. They had the ATSDR believing that the only one small housing area, the 21 housing units at Hospital Point, were exposed to contamination caused by the military. In reality, it was 1,929 units for the years of 1968–1973. They had the Secretary of the Navy's Office baffled as well and they got away with not funding the ATSDR's study because of it. The ATSDR then proceeded to pursue the funding from the White House Office of Management and Budget (OMB); they succeeded. OMB authorized the funding based upon III phases; if the 1st phase (the survey) showed enough data (cases), then it would proceed to the 2nd phase (verification of reported ailments). If the 2nd phase showed enough medically verified cases, then it would proceed into the 3rd and final phase, the epidemiological study of the confirmed cases. It is my opinion that the DoD agencies involved in the process did everything possible to kill this study in the 1st phase. They held the keys to all of the data that The ATSDR needed. To ensure the validity of the 1st phase of this study, 80 percent of the estimated 16,500 Pregnancies that occurred at Camp Lejeune between the years of 1968–1985 need to be contacted. DoD agencies initially pledged their support of these efforts, but it quickly degraded into stonewalling and delaying tactics. What better way to kill this study than by ensuring that the ATSDR did not contact the 80 percent of pregnancies required by OMB to validate the 1st phase? This very scenario was alluded to by Ms. Kathy Skipper of the ATSDR, Public Affairs Office in an e-mail to Ms. Kelly Dreyer of HQMC (CLW 3130).

Upon OMB approval of the ATSDR funding, ATSDR personnel proceeded with the writing and peer review for the protocol of their proposed study. Once all of this was accomplished, it was time to start mailing out the questionnaires to the small number of subjects that had thus far been identified. The Survey (Phase No. 1) was supposed to begin in January 1999; this did not happen because of an objection by DoN and USMC authorities in October 1998. Their objection was based on the release of the Hollywood movie A Civil Action! (CLW 2996—2999) It would appear (CLW 2995) that they had partial success in their efforts when they got the beginning of the survey kicked back by one month. In reality, the survey never started until October of 1999 when the USMC posted the “Camp Lejeune Area Water Survey” information sheet on their official USMC Web site. (CLW 3161) This document which cited the dates 1968–1985 carried on the lies; it only referred to Tarawa Terrace and Hospital Point housing areas as being affected by the contamination. It also continued the lie about Tarawa Terrace base family housing area being provided drinking water from the Holcomb Blvd. system since 1985. These people delayed the very mechanism (the study) that I was looking to for an answer to a question that had nagged at me for 15 years by this point. I wanted to know what caused my daughter’s illness and her subsequent death. I still do not have that answer, but I do have a very good idea. To have discovered that this answer got delayed for another 9 months because of the release of a Hollywood movie was, to say the least, infuriating! DoD agencies never fully cooperated with the ATSDR’s study efforts until the September/October 2000 time frame. This is when the ATSDR announced that they were going to execute a nationwide media blitz to locate enough (80 percent) of the estimated 16,500 pregnancies in order to validate Phase No. 1 of their study. It was at this point that the USMC finally somewhat relented. They (USMC) did not want the ATSDR to pursue this media campaign without their involvement. (It would make the USMC look bad.) On 1 November 2000, a joint Pentagon Press conference took place which included Marine Corps and ATSDR representatives. It is quite obvious by reviewing the packet of documents that I printed from the Internet in November 2000, that the USMC was starting to correct some of their lies, but it is quite obvious from the conflicting information on different documents that they (USMC) were having a difficult time conveying the truth. CLW 1194 Procedures for operating the new well at Tarawa Terrace really makes me wonder if these people (USMC) ever really did stop using this well. Mysteriously, most of the water treatment plant log book entries concerning water levels and booster pump operation for Tarawa Terrace ceased in May 1985. It is my suspicion that the contaminated TT new well (TT-23) continued to be operated until March 1987 when the Tarawa Terrace water treatment plant was closed. What other explanation is there for this document (CLW 1194) to have been generated?

There have been numerous federal agencies who have looked into the Camp Lejeune water contamination incident and they have issued reports, the most recent being the GAO. In February 2004, The Commandant of the Marine Corps named his Blue Ribbon panel to look into the issues surrounding the Camp Lejeune water contamination incident. This panel was appointed by the Commandant as a damage control tactic following the January 2004 Washington Post article concerning the contamination. When they (USMC) named the members of this panel, I knew that this was going to be one more white wash attempt. Senator Elizabeth Dole (R,N.C.) even called the Marine Corps selection of panel members absurd. They named former Congressman Ronald Packard (R,CA.) as the chairman; it did not take me long to figure out Mr. Packard’s connection to this situation. He had previously represented southern California 48th district whose largest industry was Marine Corps Base, Camp Pendleton. It just so happened that Camp Pendleton was where the

Commandant (General Hagee) had done the majority of his command time as a General Officer. Secondly, he chose retired General Hearney, the former Assistant Commandant of the Marine Corps (ACMC) for the years of 1994–96. I am quite certain that General Hearney had Attended briefings during his tenure as (ACMC) concerning the CLNC water situation. Thirdly, he appointed Mr. Robert Piere, the former Assistant Secretary of the Navy for Installations and Environment. It was this man's office who turned down the ATSDR's request for funding of the Camp Lejeune Childhood Cancer study in October 1997! When these panel members were named, there was such an overwhelming outcry of foul that the Marine Corps was forced to name (2) additional independent members to this panel. They appointed Dr. Robert Tardiff and Dr. William Glaze to the panel. I quickly vetted both of these new additions and found the following. Dr. Robert Tardiff was the President /CEO of the Sapphire Group. This company was nothing more than environmental hired guns; they performed risk assessments on chemicals and products for the highest bidder. Dr. William Blaze was the only member of this panel that could truly be considered objective and non-biased. The first meeting of this panel took place at Camp Lejeune in April / May time frame. After their meeting aboard the base, the panel members attended a press conference / meeting at the Jacksonville, N.C. U.S.O. This took place on a Friday and Dr. Glaze did not appear at the press interview the following Monday. His resignation from the panel was announced by the Chairman, Ron Packard. Mr. Packard stated that because Dr. Glaze was on the E.P.A.'s science advisory board, he (Dr. Glaze) feared that those duties might be a conflict of interest if they (EPA Science Advisory Board) were called upon to review the findings of the Commandant's Panel! No, Dr. Glaze who cherished his position in the world of academia saw the handwriting on the wall after he attended the first meeting at Camp Lejeune. If he wanted to retain his high standing that he had attained in academia and the scientific Community, he needed to distance himself from this fiasco. Then when the Commandant revealed his charter for this panel, I knew that is was a hoax. The charter charged the panel to review only the circumstances surrounding this situation from 1980–85. I knew right then that his entire panel was nothing more than a farce. It was akin to placing a band-aid over a sucking chest wound; too little, too late! This panel completed their charter and filed their report and while they found some fault with the actions of some departments the end result was no harm, no foul. This was what I predicted; this is what we got.

The EPA Inspector General's office did a small investigation into some of the complaints pertaining to this situation. It was very small; they interviewed me once in person and then they issued their report. I was not even aware that they had issued a report until it was cited by the GAO.

The EPA Criminal Investigation Division conducted a criminal investigation into the circumstances surrounding the Camp Lejeune water contamination. I went to a briefing on the findings of this investigation on 25 August 2005 at the Department of Justice in Washington, D.C. At the briefing, it was stated that there were no crimes committed by DoD personnel or their representatives. In a recent telephone conversation with Special Agent Tyler Amon, the agent in charge of the Camp Lejeune investigation, he stated that he had recommended charges against personnel involved in this investigation. It was the judgment of the Department of Justice prosecutors that they could not successfully prosecute those charges in Federal Court. The GAO cited the EPA, CID investigation in their report. They wrote that the EPA, CID investigator reported that the Marine Corps admitted that if failed to adequately address concerns and data requests from the public and ATSDR. Failed to address data requests from the ATSDR? Is this not a violation of federal law? The fact that Marine Corps officials knew that the ATSDR had incorrect water system data for Camp Lejeune (provided by them) and they did nothing to correct it; is this not a violation of federal law? The fact that Marine Corps officials changed the answers to an interview for the media from the truth to a lie; is that not a violation of federal laws? I can assure you that had I pulled some of these very same stunts while on active duty, I would probably still be in Fort Leavenworth Federal prison. The fact that Mr. Townsend and I were only provided an abbreviated version of the investigation report, we still have some very valid questions that have not been answered. Was the DoD main-frame computers and servers searched for all e-mails pertaining to this matter? I can assure you, the number of e-mails that we now possess are only a fraction of the ones that were generated on this subject. The e-mails that currently exist were captured from personal computers or files that someone had printed off. If we are ever going to find the truth in this situation, it is my belief that it is lying in the servers of DoD and the CDC.

Most recently, (May 2007) the GAO published a report on a study that they had conducted on the circumstances surrounding the Camp Lejeune water contamination incident. First, I would like to point out that since the beginning of the GAO's efforts related to this situation, their principle investigator changed no less than (4) times. When this study began, Mr. John Oh was the principle. He left and his responsibilities were assumed by a Ms. Bonnie Anderson. When Ms. Anderson left a Ms. Danielle Organek took over and then she was finally replaced by a Ms. Karen Doran. It is no wonder that this report is so full of errors, omissions, and half-truths. How do you conduct a valid study into a situation that spans nearly thirty years and is as sorted and twisted as the Camp Lejeune situation without at least maintaining continuity? Furthermore, this report was written n consolatory language that wreaks of cover-up. There are too many areas in this report that are erroneous for me to list in this testimony. I am, instead, providing you with my own copy of the GAO report which I have thoroughly highlighted and annotated.

The Agency for Toxic Substances and Disease Registry (ATSDR) has been a bitter sweet experience for me. It is my opinion that the ATSDR's Department of Health Assessments and Consultations (DEHAC) has become an excuse mechanism for polluters and the chemical production industry. All anyone need do is review several of their Public Health Assessments and you will notice the trend. While they have become very skilled at changing their wording, the end result is always the same. No harm, no foul! They constantly state that there are too few studies available for them to draw any firm conclusions from. Then they recommend that no further studies are required for these exposures! How are they ever going to increase the scientific knowledge on the effects these chemicals have on humans if they do not recommend studies? The only reason that a further study was recommended at Camp Lejeune was Nancy Sonnenfeld who was working with the ATSDR while pursuing her PHD performed the Small for Gestatonal Age and Adverse Pregnancy Outcome study as her dissertation and her findings were apparently very profound. This is when the ATSDR recommended the Childhood Cancer / Birth Defects in utero study at Camp Lejeune. This all mainly happened because of a dissertation! It really makes me wonder how many other N.P.L. sites that have been played down by one of ATSDR's Public Health Assessments (PHA) that truly deserved further studies.

The recent GAO report cites ATSDR officials as saying that their work at Camp Lejeune has not been delayed because of either a lack of cooperation from DoD entities or funding. If this is true, why is it that the exposure information in the Camp Lejeune final PHA is incorrect? If the DoD representatives who provided ATSDR this data were not at fault, I would assume that ATSDR staff incompetency was responsible. The fact is that the adverse pregnancy study overlooked 1,500 plus births in the Holcomb Blvd. service area. There is an unknown number of births at Tarawa Terrace that have been overlooked. Was this not because DoD representatives provided ATSDR staff with erroneous data? If it was not DoD's fault, then it must again be related to the incompetency of ATSDR staff. We know that the survey (Phase 1) was scheduled to start in January 1999, but it never started until late September of that year. We have also seen the e-mails recommending the delay of that survey because of the release of the movie A Civil Action. This delay was not requested by DoD entities? We know that the study covered the years of 1968–1985 and we now know that the Tarawa Terrace water system continued to operate until March 1987. Previously, we were told that it ceased operation in 1985. The ATSDR missed fifteen months worth of births at this base housing area. Since DoD entities have not done anything to hinder ATSDR's efforts at Camp Lejeune, then once again, this can only be attributed to the incompetence of ATSDR staff. How does the ATSDR explain all of the letters that have been written by them complaining about the lack of cooperation of DoD entities in the Camp Lejeune situation? They were cooperating, but the ATSDR just decided to write letters of complaint? The Agency for Toxic Substances and Disease Registry is, in my opinion, seriously deficient of an extremely important requirement, Intestinal Fortitude (GUTS). I realize that there is a need for cooperation between Federal agencies and departments. I also understand that every precaution should be taken to nurture and preserve a good working relationship between one another. The ATSDR needs to understand that respect is a two way street; there should be a limit to the evident lack of respect and cooperation that the ATSDR accepts from the DoD! I travel through rural North Carolina every day. During my travels, I pass through many poor, underprivileged, and under educated neighborhoods. Many of these people do not even have a grasp of the English language. God forbid that something like what happened at Camp Lejeune would happen to one of these neighborhoods. Who would be their champion? Who would stand up and fight for them? The ATSDR? They will not even make a stand to defend themselves! Would our EPA be there to defend these people? Evidently not. We had a panel of expert scientists recommend in their report last summer that our EPA should lower the protective standard for trichloroethylene

(TCE) in drinking water without any further delay. It has been almost a year since that report was released. We still do not have a new standard. No, I am afraid that if an incident such as the contaminated water at Camp Lejeune happened in one of the afore mentioned neighborhoods, it would be dead and buried along with their family members. It is my honest opinion that the citizens of our country would be better served if our Congress dissolved the ATSDR. Why pay for the up-keep of an agency that is quite obviously not accomplishing the mission for which they were created? I believe that our citizens and our environment would be better served if we contracted universities to perform the assessments at our NPL sites. I truly believe that we would get a more honest and thorough assessment than what we are getting now! Lastly, the ATSDR can not even produce the references (supporting documents) for their PHA of Camp Lejeune. (See my letter of April 16, 20007 to ATSDR and their response dated May 4, 2007.) The ATSDR stated in their 4 May 2007 letter to me that the references for the Camp Lejeune PHA had been destroyed by a private contractor. I would like to remind you that the GAO cited the EPA, CID investigation report which stated the documents had not been destroyed. It would appear Mr. Chairman that we have several Federal agencies involved in this fiasco who can not seem to get their answers straight!

In closing, I would like to say that the last 10 years have been a real experience for me. For an organization that supposedly prides itself on honor and integrity, the United States Marine Corps has certainly turned a blind eye to the documented misconduct and incompetence exhibited by their civilian employees and officers in this situation. The fact that these people are still on their payroll or in their ranks is a silent nod of approval of their actions by headquarters. In fact, most of these individuals, with the exception of one, have been promoted and given more responsibility and authority. This is a scary scenerio; do you not agree?

My daughter, Janey, fought valiantly against her illness, but the malignancy was too strong. Janey succumbed to her disease at 3:35pm, Tuesday, 24 September 1985. She was only 9 years old.

Mr. STUPAK. With consent of the committee, I'm going to ask Mr. Dingell, would you like to make an opening statement? Mr. Dingell is chairman of the full committee.

Chairman DINGELL. Mr. Chairman, the opening statement I have is an excellent one. I would like to have it inserted in the record, please.

Mr. STUPAK. without objection.

Chairman DINGELL. Mr. Chairman, thank you for providing accommodations for this hearing. Mr. Ensminger, welcome. I am pleased we are seeing you again. How long ago was it that we first met, you and I?

Mr. ENSMINGER. Spring of 2004, sir.

Chairman DINGELL. Well, I told you at that time we would approach this matter, and we will. I want to say that we will pursue it, not only for you and your loved ones but also for all of the others.

I find myself somewhat troubled that the military—and I was an infantry man in World War II—doesn't adhere to the maxim that the Marine Corps has, and that is that the Marines take care of their own. When I was in the infantry we also tried to take care of our own, too.

I would make the observation that we're not only going to pursue the situation with regard to the Defense Department, but we're also going to pursue the situation with regard now to EPA where there is some curious behavior going on which involves lack of enthusiasm for pursuing this matter.

CID agents being used as drivers and personal bodyguards for the Administrator rather than investigating important environmental crimes, which they would do, interestingly enough, under legislation that came out of this committee, of which I was one of the principal authors.

I want to say, we will find out why the Navy balked at funding health impact studies, why the Marine Corps delayed in initiating these studies, and why the Marine Corps has failed to properly produce documents on many occasions necessary for health impact studies. And also why the Navy failed for years to close down a contaminated drinking water system despite knowledge of such contamination and the risk that it imposed to our military personnel.

Bad enough to have our people shot at over there in Iraq without having the Department for which they work engage in the kind of practices which we see here, which have the kind of brutal impact upon military personnel and patriotic Americans and their families who are trying to serve their country.

So, Mr. Chairman, I commend you for what you are doing. I welcome our witnesses, and I would just make the observation, we've had some comments from some of the departments, particularly the EPA. They might not be as cooperative as we would like, and I'm going to remind them, Mr. Chairman, as we always choose to, that they can cooperate two ways: One is pleasantly, and one is painfully. And we're going to leave the choice to them, and I would urge them to take the more pleasant choice.

Mr. Chairman, thank you.

[The prepared statement of Mr. Dingell follows:]

PREPARED STATEMENT OF HON. JOHN D. DINGELL, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF MICHIGAN

Mr. Chairman, thank you for holding this critically important hearing. The sorry treatment of the wounded at Walter Reed Hospital was a national scandal and so is the treatment of the Marine casualties of Camp Lejeune's poisoned water.

Although the drinking water contamination, which is the subject of this hearing, happened decades ago—the victims of that contamination continue to suffer both physically and emotionally.

They suffer the ill effects of exposure to the toxic water; they suffer watching their babies get sick and die; they suffer waiting decades for scientific studies; and they suffer from the apparent mean spirit, penny-pinching, and indifference of their formerly revered commands, the U.S. Marine Corps and Department of Navy.

It is hard to believe, also, that to this day, former Marines and their families have not been notified that the water they drank at Camp Lejeune was carcinogenic—a fact that our Government has known for decades.

Indeed, the members of our first panel—retired Master Gunnery Sergeant Jerry Ensminger, Dr. Michael Gros, and Mr. Jeff Byron—each served at Camp Lejeune and, along with their families, consumed the poisoned water for years, but they did not learn of the contamination until 1997, 1999, and 2000, respectively. Each has a story of tragedy and courage to share with us, and I deeply appreciate their appearance before us today.

I welcome also agency representatives from the Environmental Protection Agency and the Agency for Toxic Substances and Disease Registry who will help answer some of the tough questions about what may be one of the largest contaminated water cases in our country's history.

In particular, I want to welcome Special Agent Tyler Amon of the EPA's Criminal Investigations Division who single-handedly conducted an extensive criminal investigation of this matter. His work offers insight into this tragedy and exemplifies the excellent work CID can do if allowed to do its job.

Almost 20 years ago, I sponsored the legislation that provided EPA criminal investigators with law enforcement powers so they could more effectively carry out their duties. Unfortunately, in the course of conducting our inquiry, we have learned that CID may not have the resources or leadership to do its job. As you recall, the Pollution Prosecution Act of 1990 required a dramatic increase in the number of

EPA agents assigned to CID. A dozen years after this requirement took effect; EPA still has not met this requirement.

In addition, I am concerned that of those CID agents who are supposed to be conducting important environmental crimes investigations, a large number of them are being used as drivers and personal bodyguards for the Administrator or assigned to do homeland security work that appears duplicative of what the FBI is already doing.

These are but a few of the things we are hearing, Mr. Chairman, and I hope you will consider looking further into this matter. Otherwise, this may be the last time we see such excellent work coming from agents such as Mr. Amon.

Finally, I welcome our distinguished Department of Navy and Marine Corps officials. I sincerely hope these officials can explain some of the very troubling evidence that this committee has reviewed:

- Evidence that the Navy balked at funding health impact studies—despite statutory requirements that Department of Defense fund such studies;
- Evidence that the Marine Corps delayed initiating these studies over concerns about bad publicity;
- Evidence that the Marine Corps repeatedly failed to produce documents necessary for the health impact studies; and
- Evidence that the Navy failed for years to close down a contaminated drinking water system despite knowledge of contamination.

The Marine Corps takes great pride in its maxim, “Marines take care of their own.” But if this principle is to be anything but an empty slogan, the Corps needs to do more to notify all former Lejeune residents of their possible exposure and provide prompt and adequate medical coverage to them and their families.

Mr. Chairman, I thank you for your recognition.

Mr. STUPAK. Thank you, Mr. Dingell. Ms. Solis, opening statement.

Ms. SOLIS. Thank you, Mr. Chairman, for giving me the opportunity to be here with you. I want to commend you for having this hearing. I recall very vividly the last time we had our witnesses that are here today speak to us. And at that time, I felt it was a very compelling argument for us as a committee to delve into why it is that DoD and EPA have not really been held accountable and been more transparent in their deliberations. And thank goodness that we have a new direction now, and we are trying to take hold of this discussion and debate and trying to get to the real facts about what is happening.

I have a bill that’s looking at perchlorate water contamination, which is due to rocket fuel, a little different from what you are discussing here today, but nevertheless again the DoD has failed to work in cooperation with EPA to really get at why this is happening, to provide cleanup funds, and to make sure that families, first and foremost, are taken care of. I know that you have very compelling information that we have heard before and that you have restated here, and I just thank you for being here. And as our chairman of our committee says, Mr. Dingell, we will get to the bottom of this. So thank you.

Mr. STUPAK. Mr. Inslee, I take it you are waiving your open?

Mr. INSLEE. Yes, thank you, Mr. Chairman.

Mr. STUPAK. I thank all members, and I realize we will go back and forth. We will begin questioning of 5 minutes each. I will begin the questioning. Mr. Ensminger, in your written testimony, you state that a Special Agent Tyler Amon informed you that he had recommended charges against certain individuals based on the EPA’s criminal investigation regarding water contamination at Camp Lejeune. Can you elaborate further on that?

Mr. ENSMINGER. It was during a telephone conversation with the agent several weeks ago. And I asked him about these certain instances that we have discovered in these documents where either these people had identified the fact that ATSDR had been provided this incorrect data and had never done anything to correct it. If this had been an accident, I asked him, then why didn't they voluntarily correct it? Why did they continue to just allow this to go on? What these people did, the Marine Corps, they have a Web site, and they have a chronology on that Web site. What they did was very quietly make a new entry on their chronology which corrected the error and never notified the investigating agency, which was ATSDR. And I asked the agent about that. And then I found e-mails from 1999, where a local media outlet in eastern North Carolina, channel 12, was doing a story, a three-part story covering the water contamination on the base.

The public affairs officer, a Major Scott Jack, made the reporter submit his questions in writing. There was five of them. And then the major worked up answers for those questions and then he shotgunned them around to several different people aboard the base that were involved in this. One of them was a Mr. Scott Brewer, who worked at Camp Lejeune's environmental management department. The major sent these questions with his answers around at 7:09 a.m. in the morning. By 12-something p.m. he received an e-mail back from Mr. Scott Brewer, which took the answer to question No. 3 which the public affairs officer had the truthful answer to, where he stated that the Tarawa Terrace water system remained in operation until March 1987. Mr. Brewer completely changed his answer and said that two contaminated wells at Tarawa Terrace were taken off line, and since that time, Tarawa Terrace has been provided their drinking water from the Holcomb Boulevard water system.

And I asked the agent, I said this was no accident. I said this was deliberate. This man took the truth and turned it into a lie. I said and that's not a crime? And he said, hey, Jerry, he said, I didn't say I didn't recommend any criminal charges. And he said but it was deemed by the Department of Justice that the charges that I did recommend could not be successfully prosecuted in Federal court, so they were dropped.

Mr. STUPAK. Did you ever receive any notification from the Marine Corps about the water at Tarawa Terrace? That is where you were living, right?

Mr. ENSMINGER. Sir?

Mr. STUPAK. You were living at Tarawa Terrace?

Mr. ENSMINGER. Yes, sir.

Mr. STUPAK. I think Dr. Gros said 1999, Mr. Byron said 2000. Did you ever receive any notification?

Mr. ENSMINGER. No, sir. I was not there at that time. I was gone.

Mr. STUPAK. But after that, they didn't follow you? You were in the Marine Corps for 24 years, Right?

Mr. ENSMINGER. Yes, sir. No. I never got anything.

Dr. GROS. I don't recall ever receiving anything.

Mr. STUPAK. You never received anything? Your son was part of a study in 1999?

Dr. GROS. I was notified in 1999, but we lived there from '88 through, yes.

Mr. STUPAK. Notified of your son being the subject of the study?

Dr. GROS. Correct.

Mr. STUPAK. No information that place you lived in at Camp Lejeune was being investigated for contamination?

Dr. GROS. That was the first time I heard of that.

Mr. STUPAK. Mr. Byron, yours was 2000?

Mr. BYRON. Sir, I was there until June 1985, and supposedly a letter had come out from the base commander——

Mr. STUPAK. In 1985?

Mr. BYRON. Yes, sir, to the residents of Tarawa Terrace. But my daughter was being born with multiple birth defects at the exact same time, so I don't remember getting that. The way I found out about that document was through the Freedom of Information Act. And that was after 2000. That is the first time.

Mr. STUPAK. So 2000?

Mr. BYRON. 2000 was the first time.

Mr. STUPAK. Dr. Gros, your disability is based upon your service to the military?

Dr. GROS. Based upon my military service and my disease.

Mr. STUPAK. But yet you are not included in any study?

Dr. GROS. No.

Mr. STUPAK. So that they will put you on a disability based upon drinking the water at Camp Lejeune, but they won't include you in the study determining the health effects of the water at Camp Lejeune?

Dr. GROS. That seems correct.

Mr. STUPAK. OK. My time is up. We may come back for another round of questioning. I turn to Mr. Whitfield for questioning.

Mr. WHITFIELD. I want to thank all three of you for taking time to be with us today on this important issue. And your testimony was certainly quite moving. And I noticed that in the 2003 report, the ATSDR stated that they determined that exposure to volatile organic compounds in on-base drinking water was unlikely to result in cancer and non-cancer health effects in adults. Now Dr. Gros, of course you went to medical school. And are you familiar with that 2003 report of ATSDR?

Dr. GROS. I recall reading that, and at the time I could not believe that when I read that sentence.

Mr. WHITFIELD. And Mr. Byron, had you read that report?

Mr. BYRON. Yes, I have read that report, sir.

Mr. WHITFIELD. And Mr. Ensminger, you read that as well?

Mr. ENSMINGER. Yes, sir. ATSDR, the people at the Department of Health Assessments and Consultations, if the committee would just take some time and pull a bunch of the Public Health Assessments that have been done by ATSDR where these very same chemicals were identified, it is the same wording every time. Only it is changed around, modified a little bit. But it always has the same meaning. No harm, no foul. And the way these people act, you would think they would be serving this stuff on the drink bar at McDonald's.

Mr. WHITFIELD. Yes. Mr. Ensminger, in your testimony you had mentioned specifically that DoD had been notified by three separate laboratories of the problems with the drinking water at Camp Lejeune. Do you remember the time frame of those lab reports that were given to DoD?

Mr. ENSMINGER. LANTDIV, which is the Atlantic Division of the Naval Facilities Engineers out of Norfolk, came down and did a composite water sample on 1 October 1980. The composite water sample was water from eight different systems combined into one sample. And they sent that off to an analytical laboratory. The results of those samples, with six clean systems included in it, exceeded the standards for today for some of the VOCs. That was one. Second, the U.S. Army's Environmental Hygiene Team had been brought to Camp Lejeune to start testing the water for the TTHMs, which had come into effect, the standards for them.

They identified multiple times and told Camp Lejeune how to test for this stuff, which was with the gas chronometer, mass spectrometer system, the GCMS, told them repeatedly they needed to test for organic hydrocarbons, chlorinated hydrocarbons. Finally, the laboratory chief wrote it in parentheses, solvents, with exclamation points. And then in 1982 Grainger Laboratories from Raleigh, North Carolina, a State-certified laboratory, the very same people that wrote the letter on 10 August 1982 to the commanding general, stating that this stuff was more important from a health standpoint than what they had sent the water in to be tested for. They did nothing. And on the Marine Corps chronology these people say, well, we knew we had NACIP, which was a program to identify contaminants. They said, well, since we knew they were coming, we pondered this thing for a year-and-a-half, mind you, how we were going to take care of this.

Mr. WHITFIELD. OK. So it has been documented that there were at least three labs that gave them specific information about a problem with the drinking water. And the first one was October 1, 1980, and then the last was 1982, and then somewhere in-between?

Mr. ENSMINGER. Well, the Grainger Laboratory, there are multiple analytical results after 1982 all the way through, up through 1984 that identify these chemicals and the presence in the water, and each time they found them they annotated it.

Mr. WHITFIELD. My point is as early as 1980 they were aware or should have been aware.

Mr. ENSMINGER. Yes, sir.

Mr. WHITFIELD. And what years did you live at Camp Lejeune.

Mr. ENSMINGER. I lived at Camp Lejeune multiple times, sir.

Mr. WHITFIELD. When Janey was born.

Mr. ENSMINGER. From 1973 through 1975 my wife spent her first trimester of the pregnancy with Janey at Tarawa Terrace. And then I was at the time in drill instructor school at Parris Island. When I finished DI School, I was transferred, and we left there December 20, 1975.

Mr. WHITFIELD. And Dr. Gros, what years were you there?

Dr. GROS. July 1980 to July 1983.

Mr. WHITFIELD. And Mr. Byron?

Mr. BYRON. I was there approximately February 1982 to June 1985.

Mr. WHITFIELD. OK. And you had mentioned, Mr. Byron, in your testimony that, at page 29, that the GAO did not present the document in its entirety.

Mr. BYRON. Yes, sir. I have the document right here.

Mr. WHITFIELD. Which document is that?

Mr. BYRON. That is the notice to residents of Tarawa Terrace. It is kind of fuzzy, but it is definitely dated April 1985. It looks like April 30. My daughter was born April 27, with birth defects, that same year.

Mr. WHITFIELD. OK. And what was lacking in this notification?

Mr. BYRON. The actual what was missing was the body of the information that should have been provided to the residents. And what they were more concerned with, like I said, I can read it to you. It says, until, however, daily use consumption must be reduced significantly. You are the only ones who can make this happen.

I solicit your cooperation and assistance and implementation of the following water use restrictions. Reduce domestic water use. Don't let water run while washing, shaving, brushing teeth, et cetera. Wash clothes only when you have a full load. Flush toilets only for sanitation purposes. And this is the one that I really am concerned with, store cold water in refrigeration or for drinking. So they want me to store poisoned water for my children to drink. But they don't spell out that—No. 1, it says that these are—they found minute trace amounts of several organic chemicals. 1,580 parts per billion is not minute or trace.

I take offense to that personally, because I lived there at the time, and GAO tried to represent that it's 158 parts per billion versus 1,580. And once I corrected that they also put that in their appendix still at 158 parts per billion. They didn't do their homework.

Mr. STUPAK. Mr. Byron, if I may, I am going to have one of our clerks grab that document from you, and we will make a copy so we have it for our committee.

Mr. WHITFIELD. And my time has expired. Thank you.

Mr. STUPAK. Mr. Inslee for questions?

Mr. INSLEE. Thank you. Mr. Byron, what was the document, what was the date of the document you were just reading?

Mr. BYRON. The document it looked to me——

The CLERK. April 30, 1985.

Mr. STUPAK. April 30, 1985.

Mr. INSLEE. In your view, speaking from your position, what would you suggest should be a requirement for notification for people in those circumstances? Now you have told us essentially they described this as quote, trace amounts, in the document they gave a resident.

Mr. BYRON. Yes, sir. They also called it organic chemicals instead of saying volatile organic chemicals. The word volatile would have clued me in immediately if that document had showed up at my home. And it probably would have clued me anyway, just the fact that it said chemicals.

Mr. INSLEE. So what do you think should be our standards either in the Marine Corps or Environmental Protection Agency or any other——

Mr. BYRON. The standard at present is 5 parts per billion. So if it exceeds 5 parts per billion, I believe governmental officials, military and civilian, should be held responsible for not notifying individuals. They went 15 years before a letter came to my house, which looked like junk mail by the way. I have it here. The front of this letter, this document it says nothing official from the Government on it.

Mr. INSLEE. What does it say?

Mr. BYRON. It says NORC, University of Chicago National Opinion Research Center, 3050 Finley Road, Downers Grove, IL, 60515. Please forward. Address correction requested.

I only lived two places the whole time. It doesn't say anything about being an official document from the Government.

Mr. INSLEE. It seems to me that under these circumstances, the Government ought to have some protocol of language it uses so that a person will understand that there is an enhanced health risk associated with this, something like either a higher health risk or danger or toxic information enclosed or something to that effect.

Mr. BYRON. That would have helped.

Mr. INSLEE. Would that make sense to you?

Mr. BYRON. Yes, sir, it does. And that would have helped.

Mr. INSLEE. I hope that we are going to try to find the right mechanism of doing that to have this not happen again. I have to tell you this is so disturbing, after the Tillman incident to have this continued failure is very disturbing. Yes.

Mr. ENSMINGER. Yes, Congressman, I have found discussions, internal e-mails at Camp Lejeune between Camp Lejeune and Headquarters Marine Corps where they systematically changed the wording about these chemicals to volatile organic compounds to make it sound better. They have been playing a game. I mean it was a game of minimization.

Mr. INSLEE. Dr. Gros, you said that your disability is associated with this, but you are not included in any of the studies. I just can't comprehend how that could happen. Do you have any explanation for it? Is it a glitch or is this programmatic failure or what?

Dr. GROS. Well, when we were facing the enormity, the financial enormity of the transplant, losing my practice, we were looking at every possible source of help we could find. I visited with my representative, Representative Kevin Brady at the time, and went with a toxicologist and my wife. And we had prepared a dossier and gave a presentation of what had happened. And he was impressed that this was a problem. He also saw the ATSDR documents, which had shown that they were admitting that the water was highly contaminated. And he immediately expedited my trip to the VA in Houston. And after that, I was declared 100 percent service-connected disabled. I don't know how that process comes about. But I was certainly happy to have some help. And it has been very useful for pharmacy items. However, some of the more expensive things, the bone marrow transplant was refused by the VA. And some of the more expensive items like photopheresis and hemodialysis, I had to be dialized for 6 months for temporary renal failure, and I still have chronic renal failure. That funding for that has been very difficult to obtain. There is a real problem over there with——

Mr. INSLEE. But with a medical background, how could you explain not being included in any of the screens, any of these studies?

Dr. GROS. That is a good question, Congressman. That's why I said when I saw that initial document, the health assessment in 1997, I just said oh, come on. I said this is a joke. I said just because you have thousands of people here that are going to be a little hard to find doesn't mean they shouldn't be studied.

Mr. INSLEE. I saw in one of your testimonies I was reading you made reference to a movie, A Civil Action, another one was Erin Brockovich, that came out about some similarities to this situation.

Dr. GROS. Right.

Mr. INSLEE. Do you have a concern that a concern about claims has led to some poor judgments here along the way by the various Government agencies or not?

Dr. GROS. Well, I definitely think so. It would seem that way. When you inquire about this, apparently there is a lot of defensiveness. I know Jerry has done a lot more of this inquiry than I have. I have been busy being sick and trying to get well. I don't have any time to work on the Base Commission at Camp Lejeune, and I don't live there, so Jerry could probably answer that question better than I can.

Mr. ENSMINGER. There are several e-mails, internal e-mails where they are discussing liability. And it was if not the No. 1 driving force behind the deceit——

Mr. INSLEE. We just hope these agencies will be more concerned about your health than the claims prospects. We hope that will start. And we will try to do what we can. Gentlemen, thank you for your continued service to the country. You are doing it today. And we thank you for your many years of service. Thank you.

Mr. STUPAK. Thank the gentleman. Do you have that chart back up there, Jerry? Mr. Inslee, I don't know if you were here when we introduced it earlier in the opening testimony there. It shows the different levels. You mentioned Woburn and Erin Brockovich. It is 267. It is 18,000 at some point at Camp——

Mr. BYRON. May I make a statement there?

Mr. STUPAK. Sure.

Mr. BYRON. According to the GAO report, on table 3, where they are listing the levels of toxicity at Hadnot Point, I don't see 18,000 there. And that says February 7. And these readings are from the 4th and the 8th of February of the same year.

So I can't understand why GAO is reluctantly—by the way, this is the same table that they had 1,580 parts was listed at 158 during the draft report. So I gave them a copy of the document that shows the levels of toxicity, and 18,000 is not on there I see. And here is another thing concerning the GAO report. I don't understand why it wasn't possible to scan the original documents and show them in their true form so that members of Congress can make their own judgment, instead of having GAO try to convince them that there was some low levels of toxicity.

There are several places where footnotes are stated that the detection limit for the instrument used to analyze the samples was 10 parts per billion. Well, sir, that is not on that document. And every table that they show says that. And I challenge them to show me, other than one document, the Jennings document, which by the way they took out the detection limit column to where you could tell whether or not on your own and didn't need them to tell you how to read it, but this concerns me that they did not show the original documents in their original form.

And all these documents that I have in front of me were from Marine Corps Base Camp Lejeune and indicate high levels of toxicity. Yet when GAO shows their report, they are only interested in showing you those documents that show lower levels. And they even have levels of toxicity missing in their tables. So my personal opinion is that the Marine Corps Headquarters, whoever gave them the information, has tried to perpetrate a fraud here. And that, in my estimation, is criminal, because the American taxpayer is paying for the money for this report to Congress, and it should be accurate and concise, and not full of conjecture with legal ramblings on it looks to me to be a document that they might present in a legal matter later. And that is how it has been presented.

Mr. STUPAK. Mr. Byron, if I may, the document we noticed to residents of Tarawa Terrace——

Mr. BYRON. Yes, sir.

Mr. STUPAK. On the bottom there is handwriting. We want to put it in as hard part of the record. But at the bottom here, there is handwriting that says "suggested no adverse effect. Recommended levels." is that your handwriting?

Mr. BYRON. No, sir, that is not, but I do have a document that refers to that.

Mr. STUPAK. I know. I just wanted to know if it was your handwriting.

Mr. BYRON. That is not my handwriting, sir.

Mr. STUPAK. Without objection, we will have this document of April 30th, 1985, be made part of the record. Thank you. I have to go to Mr. Walden here, and we can come back. Mr. Walden for questions.

Mr. WALDEN. Thank you, Mr. Chairman I want to thank our witnesses today, and all of you for coming forward. I know it is difficult from every perspective. I can't imagine, begin to imagine what you all have been through. But it is our job to make sure it doesn't happen again to anybody else. And those who are going through this elsewhere we need to help as well. My understanding, Mr. Byron, and we will get at this issue you have raised, because I have some datapoint issues of my own, is that the Marines did give the GAO all the information. Whether GAO chose to use it or not is a question we are going to get to. And that that 18,000 figure actually was apparently a sample taken after the well was closed. So we will get into all that, because I am concerned about some of the data as well.

Our staff followed up on some of the lists, and maybe we can put that chart up for a moment. There is an attachment that goes through various readings at the various facilities over the years. And when we probed to find out which were the worst cases we got this response back, indicating that of the top five that we were looking at. We came back and said, well, actually three of the datapoint sets were wrong for various reasons and two are correct. So it brings into, at least for this member of Congress, that the ATSDR's database may have bigger flaws than what we were looking at originally. I am concerned, too. They are doing a epidemiological study here, right? What happened at Camp Lejeune?

Dr. GROS. Just in utero.

Mr. BYRON. Children in utero.

Mr. WALDEN. OK. And in stereo apparently there. And I guess the question I am going to have for the military later is given the extraordinary and awful circumstances you all have been through with yourselves and your children, are they doing epidemiological studies elsewhere?

Mr. ENSMINGER. Where?

Mr. WALDEN. At sites with contamination?

Mr. ENSMINGER. You mean at other sites?

Mr. WALDEN. Yes.

Mr. ENSMINGER. Not on adults, sir.

Mr. WALDEN. Adults or children. On anybody. Do any of you know?

Mr. ENSMINGER. As far as I know, and like I said before, every Public Health Assessment that I have seen come out of the Department of Health Assessments and Consultations at ATSDR, the wording is different, but it always means the same. No harm, no foul.

They don't hurt adults.

Mr. WALDEN. They do the health assessments, but I am talking about the epidemiological.

Mr. ENSMINGER. Sir, if DHAC kills the thing in the Public Health Assessment no studies get done. It is a dead issue at that point.

Mr. WALDEN. Literally.

Mr. ENSMINGER. Literally.

Mr. WALDEN. How does that make you feel?

Mr. ENSMINGER. Well, they constantly make the claim in there that there is not enough studies to relate to—based on exposures to these chemicals, but then in the next sentence they say, well, we don't recommend any study on this exposure either.

Mr. WALDEN. Dr. Gros?

Dr. GROS. Congressman, if I can make a statement, I am not an epidemiologist, but it would seem to me that with the number of people involved in this one incident that we could probably do a pretty darn good study if the will is there to do it. But that is the problem. As you had this incredible number of people that have been exposed over these years, they dispersed because of the nature of military personnel. When they retired they leave, they go all over the country and the world. But they still have Social Security numbers, they still pay taxes, I assume. They still are as findable as I was. When they wanted to do the in-utero study on my child they had no problem finding me. I was a phone call out of the blue. I was amazed. So they have a way of finding you.

Mr. WALDEN. Sure they do.

Dr. GROS. So I don't buy the argument that these people cannot be found to do a look back study or to examine.

Mr. WALDEN. You think a look back given your professional.

Dr. GROS. At least to get some sort of information certainly.

Mr. WALDEN. One of the things that deeply concerns me is that at Wurtsmith Air Force Base in October 1977, they first detected

TCE in the drinking water. And I am told that officials immediately took steps to identify the contaminated wells, and within 1 month began closing the contaminated wells. So by November 1977, they were closing the wells. Now contrast that with Camp Lejeune, where significant drinking water contamination was discovered in 1980 and 1982, but officials waited years before they identified the contaminated wells, and then closed them down in 1985.

Any of you, in all of your research, and obviously Mr. Ensminger, you have done incredible research, and we appreciate you bringing that to us and to the public, can you explain why the Air Force acted in a matter of a month and the Navy——

Mr. ENSMINGER. Sir, even the Department of the Navy did the same thing at another site. There was Warminster Naval Air Development Center outside of Philadelphia, Pennsylvania. 1979 they identified these same chemicals in water supply wells at that facility. They took them off line immediately. But we must have two different Departments of Navy and two different standards somewhere in the mix here.

Mr. WALDEN. What was the EPA standard at that time for these chemicals in drinking water? What did they say was safe or unsafe?

Mr. ENSMINGER. They had SNARL, sir.

Mr. WALDEN. Which means——

Mr. ENSMINGER. The GAO report stated that Camp Lejeune officials stated that the contaminant levels in the drinking water at the main part of the base had not exceeded the SNARLs at that time. They did, however, exceed the SNARLs at Tarawa Terrace for PCE. The GAO said they never exceeded the SNARLs. I have a memorandum written in August 1982 by the base quality control chemist, Ms. Elizabeth Betz, that states right there in paragraph 8.

Mr. WALDEN. Yes, sir.

Mr. ENSMINGER. Well 651 tested 3,400 parts per billion of TCE in the samples that were pulled on 16 January 1985. They didn't get them back until 4 February. And the 4 February sample—when they closed the well on the 4th of February, they pulled another sample that day, and the well was running, and it tested—they got the results back for that on the 7th of February. And it was 18,900 parts per billion of TCE, 8,070 per billion of DCE, 400 parts per billion of PCE, and 633 parts per billion of vinyl chloride. And, sir, this one well caused the levels of finished drinking water on that base, where they were pulling samples because of the fuel that had gotten in there, to exceed 1,000 parts per billion at the tap at an elementary school. One well. They had already pulled seven wells off line previously.

Only God knows what levels were in that water when three or four of these contaminated wells were pumping at the same time in conjunction with well 651. The highest recorded levels that had been found were 1,400 parts per billion.

Mr. BYRON. May I make a statement? I have the document that Jerry has alluded to, August, 1982. And on paragraph 5 if says tetrachloroethylene at high doses——

Mr. STUPAK. Exhibit No. 6 in that book, if anyone cares to look. It is exhibit No. 6.

Mr. BYRON. Tetrachloroethylene in high doses has been reported to produce liver and kidney damage and central nervous system disturbances in human beings. EPA SNARLs for tetrachloroethylene is 2,300 parts per billion for one day, 175 parts per billion for 10 days, and 20 parts per billion for long-term exposure. Where I was living was 1,580 parts per billion PCE exposure at the time. And they tried to say through the GAO report that the individuals and environmental department at Marine Corps Base Camp Lejeune were not educated enough and were not informed enough by LANTDIV and NACIP. And I consider this a fraud. I don't believe that. I believe they were well notified. This document from the chemist at Marine Corps Base Camp Lejeune shows that they were well notified. And I think the GAO, like I said, is biased.

Mr. STUPAK. No other questions?

Mr. WALDEN. My time has expired.

Mr. STUPAK. Your time has expired, but go ahead.

Mr. ENSMINGER. You had asked earlier about standards and different standards. Sir, I found the BMID instruction, which is dated 25 August, 1972. And the subject is standards for potable water. I would like to point out to the Congressman subparagraph E of paragraph 5, where it outlines pollution. Now this is the Navy's own standard. As pollution as used in these standards means the presence of any foreign substance. And then in parentheses it says organic, inorganic, radiological or biological in water which tends to degrade its quality so as to constitute a hazard or impair the usefulness of the water. That was in 1972.

Mr. STUPAK. That is document No. 20 in the book, Mr. Gros, if you are looking for it. Let me ask this question, if I may. Mr. Byron, any of your children apply for disability?

Mr. BYRON. Through the VA, sir?

Mr. STUPAK. Yes.

Mr. BYRON. No, sir.

Mr. STUPAK. Any suggestions——

Mr. BYRON. On previous trips to Washington I have been to the Veterans Administration and spoke to Assistant Director Mark Brown, and he had advised me that before the Veterans Administration could get involved that it would have to go through the Armed Services Committee, and be basically giving them permission to take care of these individuals. And I am aware of no legislation at present that allows for that.

Mr. STUPAK. There are 853 claims, I believe, being made. Are your children involved in any of those claims?

Mr. BYRON. My children are involved in those claims, yes, sir.

Mr. STUPAK. They are?

Mr. BYRON. Yes, sir. Because I feel that the Marine Corps is negligent and responsible.

Mr. STUPAK. OK. You said in your testimony, your daughter went to 57 visits in 30 months?

Mr. BYRON. Yes, sir.

Mr. STUPAK. Did they ever refer her off base to a children's hospital or——

Mr. BYRON. No, sir, they didn't, but they did take blood tests. And after I was identified as a family—my one child to be part of the study—we got our medical records. And I had to ask for copies of my medical records before I left the Marine Corps, because my one daughter had been seen so many times.

So I am a very fortunate one of very few that has their medical records, because the base has said that many of those records were destroyed in storage somehow. But she was seen 57 times, and we were never recommended outside of base. But levels of her hemoglobin or whatever they check for were below the levels that were listed on the form. And no one notified us and no one took action. And 6 months later she came down with this bone marrow disease called aplastic anemia, which is the opposite of what Jerry's daughter has, but also to cure it requires a bone marrow transplant. Now she went into remission, so she never did require that, but our daughters also went through the bone testing that he is familiar with and that his daughter was crying in his ear about. And ours also experienced the same thing, where they took bone marrow samples from her hip.

Mr. STUPAK. When you say your daughter was below the level, you mean indicative of a problem?

Mr. BYRON. Of a problem, yes, sir.

Mr. STUPAK. Not within the normal range.

Mr. BYRON. Not within the normal range, yes.

Mr. STUPAK. Mr. Gros, you were a doctor there at the base. In looking back now, was there any increased number of miscarriages or anything that you noticed?

Dr. GROS. That is a frequent question. But I don't know how to answer it, because we didn't have the big picture. We basically were working in the forest, surrounded with the trees. 240 deliveries a month, busy, busy clinic. We didn't have any inkling at the time that there may have been that type of a problem. I don't think that anyone ever brought that up as an issue. The pediatrics department certainly didn't alert us.

Mr. STUPAK. All the women there are basically child bearing years, right?

Dr. GROS. Well, it is a very large population of young women, that is correct.

Mr. STUPAK. And generally a healthy population.

Dr. GROS. Very healthy population. I would say that the incidence of abnormalities that you would frequently see with older moms, moms over the age of 35—they don't like to be called older moms anymore—but how should we say the more experienced mothers that have more kids, they tend to have a greater instance of genetic abnormalities. And we didn't see much of that in our population. I really don't think that it came out at the time. I think the pediatrics statistics would probably be more telling than what we saw as obstetricians.

Mr. STUPAK. But your medical records for these patients would document it if there was a miscarriage, would it not?

Dr. GROS. Correct. There is a log kept. In labor and delivery, usually most of the patients would have a D&C under sedation, and just to make sure there weren't any complications, and then there was a record kept of that. So we should have that record. I would think so anyway.

Mr. STUPAK. One would hope so.

Dr. GROS. Yes.

Mr. STUPAK. You had a question, Mr. Walden?

Mr. WALDEN. No.

Mr. STUPAK. If not, I would like to thank this panel for their testimony. I know at times it has been very difficult. But without you, I don't think the story could get out about what we are trying to do here, not just Camp Lejeune, but any places throughout this country—DoD properties that have to be cleaned up. Mr. Ensminger?

Mr. ENSMINGER. I would like to inform you of one other issue. Well 651, which was the highest contaminated well at Hadnot Point, was constructed in 1971 at the back corner of the base disposal yard. The back corner of the junk yard. And the Navy facilities engineers people did the site survey for the location and the construction of that well. And that lot had been in operation for some odd 30 years by that point.

Mr. BYRON. Sir, may I make one last comment also?

Mr. STUPAK. Sure.

Mr. BYRON. I was quite concerned by reading the GAO report to find out that for the in-utero study for the Agency for Toxic Substances Disease Registry they had found a comparison group of individuals at Marine Corps Base Camp Lejeune of 548 children. It is my contention, and I believe everyone here, that those individuals were more than likely exposed because of their connection to the base. If they lived around the base and were military personnel, they went on base. If the women were pregnant at the time and drank from the water fountain, they were exposed in the first trimester. So birth defects and so forth might show up.

What disturbs me is that after being on the Citizens Advisory Panel of the Agency for Toxic Substances for 2 years that I had no idea that they had a comparison group until I read the GAO report. I don't know why that has occurred, and I think that should be a question asked by individuals of the ATSDR. But it does not lend itself to transparency. And in this case that is the most important thing, that we be able to determine that what is being told to us is the truth. And the reason that we are here is to stop this from happening at any other bases in the future. So thank you very much.

Mr. STUPAK. Thank you. This panel is dismissed. Thank you, gentlemen.

I will call up our next panel, Major General Robert Dickerson, Jr., Commanding General at Camp Lejeune; Ms. Kelly Dreyer, Environmental Restoration Program Manager at the U.S. Marine Corps Headquarters; Ms. Pat Leonard, Director of the Office of Judge Advocate General, Claims Investigation and Tort Litigation; Mr. Thomas Sinks, Deputy Director of the National Center of Environmental Health, Agency for Toxic Substances and Disease Registry, ATSDR; and Frank Bove, senior epidemiologist at ATSDR; and Morris Maslia, environmental engineer at ATSDR. Would you all come forward, please?

As you know, it is the policy of the subcommittee to take all testimony under oath. Please be advised that witnesses have the right to be, under the rules of the House, to be advised by counsel during their testimony. Do any of you wish to be represented by counsel? If so, we need the name of your counsel. General? Anyone? No? Everyone's indicating no. So while you rise, I ask you to raise your right-hand, please.

[Witnesses sworn.]

Mr. STUPAK. Let the record reflect everyone has answered affirmatively as to the oath. They are now under oath. And we will begin with opening statements. We will start to my left. General Dickerson, please.

STATEMENT OF MAJOR GENERAL ROBERT DICKERSON, JR., COMMANDING GENERAL, CAMP LEJEUNE

General DICKERSON. Mr. Stupak and distinguished members of the subcommittee, thank you for the opportunity to appear before you and participate in this hearing regarding past contamination of two of Marine Corps Base Camp Lejeune's drinking water systems. We are here today because the health and welfare of our Marines and their families remains a top priority. We continue to support and fully cooperate with the Agency for Toxic Substance and Disease Registry to determine if contaminated water aboard our installation harmed Marines and their families. In 1982 and 1983, two of Camp Lejeune's eight public drinking water systems were determined to be contaminated by two chemicals, trichloroethylene, TCE, and perchloroethylene, PCE, also known as tetrachloroethylene, commonly found in degreasing agents and dry cleaning solvents.

At the time, no environmental standards or regulations in regard to the use and disposal of TCE or PCE were in place. In fact, initial regulation of these volatile organic compounds under the Safe Drinking Water Act began in 1987 and 1991, respectively. Volatile organic compounds were first discovered in the Camp Lejeune drinking water in 1980, while a Navy contractor was conducting tests for trihalomethanes. It was determined that an interference chemical was present in the water at the treatment plant and tap. However, the type of chemical or source was unknown.

Base personnel continued to sample the water over the next several years, utilizing various laboratories. Sampling results varied, calling into question the validity of the test. In 1982, TCE and PCE were determined to be the interference chemicals, and in late 1984, the groundwater was determined to be the source. As data on individual wells was received, impacted wells were removed from service. In total, 10 drinking water wells aboard the installation were immediately removed from service. Subsequent investigation by the State of North Carolina revealed leaks from an off base dry cleaner had contaminated the wells near the Tarawa Terrace housing area, while on base sources contributed to the contamination of the Hadnot Point water systems. This unfortunate situation happened over 20 years ago. And while there are still large gaps of knowledge on potential health implications due to exposure to TCE or PCE today, these gaps were even greater back in the 1980's. What the Nation accepted as environmental standards and regulations

20 years ago has drastically changed as a result of scientific knowledge and awareness. Camp Lejeune has been investigated by the Environmental Protection Agency's Criminal Investigative Division and the General Accountability Office. Both investigating agencies reported that Camp Lejeune's response to the contamination was appropriate at that time and consistent with existing environmental standards and regulations. Additionally, the Commandant of the Marine Corps chartered his own expert panel to look at past activities, which also concluded appropriate actions were taken based upon the guidance and information provided by Federal agencies. We have relied on the expertise of ATSDR to determine whether or not the past contaminated water on our installation harmed our Marines and their families.

Although we are not part of the design or implementation of the ATSDR survey or study, we remain committed and fully support their efforts. Full access to personnel, infrastructure, installations and requested documentation was granted to ATSDR from the start and will be available for the duration of their study. Additionally, we act as a liaison with Federal and State agencies to insure ATSDR obtains all resources necessary to move forward with their work, ultimately bringing us one step closer to an answer.

In order to educate and communicate with family members and Marines that may have been exposed to the contaminated water, a robust communications campaign was initiated to encourage participation in the ATSDR survey. An official Web site regarding the Camp Lejeune water was developed with frequently asked questions, maps, press releases and advisories, as well as contact numbers and links for additional information. This Web site is currently in the process of being updated. To help better understand public exposure to TCE and PCE from drinking water and any potential health effects, the Marine Corps is funding a new effort by the National Academy of Sciences to conduct a comprehensive review and evaluation of all medical and scientific information available on the link between TCE and PCE exposure via drinking water and adverse health effects.

Ultimately, everyone is here today for the same reason, to determine whether or not our Marines and their families were harmed in any way by contaminated water. We fully complied with environmental laws and regulations, and we remain committed to working with ATSDR and other Federal agencies involved with the study. We must rely on the experts for the answers. We are pleased to answer any questions you may have.

Mr. STUPAK. Thank you, General. Ms. Dreyer.

STATEMENT OF KELLY DREYER, ENVIRONMENTAL RESTORATION PROGRAM MANAGER, U.S. MARINE CORPS HEADQUARTERS

Ms. DREYER. Chairman Stupak, Congressman Whitfield, distinguished members of the subcommittee, thank you for the opportunity to appear before you and participate in this hearing regarding past contamination in two of Marine Corps Base Camp Lejeune's drinking water systems. My name is Kelly Dreyer, and I am an environmental engineer, and the Installation Restoration Program Manager At Headquarters Marine Corps. As the Installation Restoration Program Manager, my job is to establish Marine Corps policy and guidance on cleanup issues across the Marine Corps. In addition, I serve as a liaison between the Marine Corps and the Naval Facilities Engineering Command, which executes the cleanup program for the Navy and the Marine Corps, as well as other agencies involved in the cleanup program, particularly when issues cannot be resolved at an installation level. As General Dickerson stated, the health and welfare of our Marines and their families is very important to the Marine Corps. As part of the cleanup program, all military installations on the National Priorities List of Hazardous Waste Sites, including Camp Lejeune, which was listed in 1989, undergo a Public Health Assessment conducted by the Agency For Toxic Substances and Disease Registry, ATSDR, to determine if there are any current or past health concerns resulting from past practices.

My significant involvement in the Camp Lejeune past water issue began in 1997, when the Public Health Assessment for Camp Lejeune was being completed by ATSDR. The Public Health Assessment concluded that adverse health effects as a result of the impacted water were unlikely in adults, but recommended a follow on study of children in the womb, the most susceptible population to the potential chemical impacts. At that time I participated in meetings between health scientists and the Department of Navy and ATSDR about how such a study might be designed. In 1999, the health study began as a survey to determine whether or not a statistically significant study population could be reached for a case control study.

In 2000, ATSDR requested assistance from the Marine Corps to reach additional participants for the survey. At that time, the number of participants was approximately 6,500. ATSDR needed over 12,000 for a statistically valid study. Over the next year, I worked with our Headquarters Marine Corps and Department of Defense offices to develop and implement a communications strategy, which included two administrative messages to all Marines, press releases to over 3,500 media outlets, searches of Marine Corps databases, and working with the Department of Defense Privacy Office to enable the release of manpower information to ATSDR. As a result of this effort, ATSDR closed the survey in January 2002, after reaching 12,598 participants. Since that time, I have been working with Marine Corps Base Camp Lejeune to provide information requested by ATSDR for their water model and study activities. Although ATSDR has had full access to all information, sometimes such information is difficult to locate due to the fact that the records requested are over 20 years old and may have been destroyed or because offices have moved around the base.

The Marine Corps recently hired a contractor to perform a comprehensive search of Camp Lejeune to provide a better confidence level that all relevant documents have been found. ATSDR has been provided access to all documents that were found during this search. In addition, we have been working with agencies outside of the Marine Corps to ask them to provide information that is under their control. I have personally spoken with numerous people who feel they may have been harmed by the impacted water. Their stories are emotionally compelling. That is one of the reasons why we continue to support and fully cooperate with ATSDR. We have funded the National Academies of Sciences study because we all have a common goal, to determine if the Camp Lejeune drinking water harmed any of our Marines or their families. I am also pleased to answer any questions you may have.

[The prepared statement of General Dickerson and Ms. Dreyer follows:]

STATEMENT OF MAJOR GENERAL ROBERT DICKERSON AND KELLY DREYER

Chairman Stupak, Congressman Whitfield, distinguished members of the subcommittee; thank you for the opportunity to appear before you and participate in this hearing regarding past contamination of two of Marine Corps Base Camp Lejeune's drinking water systems. We are here today because the health and welfare of our Marines and their families remains a top priority. We continue to support and fully cooperate with the Agency for Toxic Substance and Disease Registry to determine if contaminated water aboard our installation harmed Marines and our families.

In 1982 and 1983, two of Camp Lejeune's eight public drinking water systems were determined to be contaminated by two chemicals—trichloroethylene (TCE) and perchlorethylene (PCE; also known as tetrachloroethylene)—commonly found in degreasing agents and dry cleaning solvents. At the time, no environmental standards or regulations in regards to the use and disposal of TCE or PCE were in place. In fact, initial regulation of these volatile organic compounds under the Safe Drinking Water Act began in 1987 and 1991 respectively.

Volatile Organic Compounds were first discovered in the Camp Lejeune drinking water in 1980, while a Navy contractor was conducting tests for trihalomethanes. It was determined that an interference chemical was present in the water at the treatment plant and tap; however, the type of chemical or source was unknown. Base personnel continued to sample the water over the next several years, utilizing various laboratories; sampling results varied, calling into question the validity of the tests. In 1982, TCE and PCE were determined to be the interference chemicals, and in late 1984, the groundwater was determined to be the source. As data on individual wells was received, impacted wells were removed from service. In total, 10 drinking water wells aboard the installation were immediately removed from service. Subsequent investigation by the State of North Carolina revealed leaks from an off-base dry cleaner had contaminated the wells near the Tarawa Terrace housing area, while on-base sources contributed to contamination of the Hadnot Point water system.

This unfortunate situation happened over 20 years ago and while there are still large gaps of knowledge on potential health implications due to exposure to TCE or PCE today, these gaps were even greater back in the 1980s. What the Nation accepted as environmental standards and regulations 20 years ago has drastically changed as a result of scientific knowledge and awareness.

Camp Lejeune has been investigated by the Environmental Protection Agency's Criminal Investigation Division and the General Accountability Office. Both investigating agencies reported that Camp Lejeune's response to the contamination was appropriate at that time and consistent with existing environmental standards and regulations. Additionally, the Commandant of the Marine Corps chartered his own expert panel to look at past activities which also concluded appropriate actions were taken based on the guidance and information provided by Federal agencies.

We have relied on the expertise of ATSDR to determine whether or not the past contaminated water on our installation harmed our Marines and their families. Although we are not part of the design or implementation of the ATSDR survey or study, we remain committed and fully support their efforts. Full access to personnel, infrastructure, installations and requested documentation was granted to ATSDR from the start and will be available for the duration of their study. Additionally, we act as a liaison with Federal and state agencies to ensure ATSDR obtains all resources necessary to move forward with their work, ultimately bringing us one step closer to an answer.

In order to educate and communicate with family members and Marines that may have been exposed to the contaminated water, a robust communications campaign was initiated to encourage participation in the ATSDR survey. An official Web site regarding the Camp Lejeune Water was developed with frequently asked questions, maps, press releases and advisories, as well as contact numbers and links for additional information. This Web site is currently in the process of being updated.

To help better understand public exposure to TCE and PCE from drinking water and any potential health effects, the Marine Corps is funding a new effort by the National Academy of Sciences to conduct a comprehensive review and evaluation of all medical and scientific information available on the link between TCE/PCE exposure via drinking water and adverse health effects.

Ultimately, everyone is here today for the same reason: to determine whether or not our Marines and their families were harmed in any way by contaminated water. We fully comply with environmental laws and regulations and we remain committed to working with ATSDR and other Federal agencies involved with the study. We must all rely on the experts for the answers.

We are pleased to answer any questions you may have.

Mr. STUPAK. OK. Ms. Dreyer, I didn't think you were going to do an opening because you never submitted it to this committee. That is fine, but I would like your opening statement. And I want to make copies, so we have a chance to look at it, because I am glad you did make an opening, because we have many questions for you.

Ms. Leonard, you want to give your opening statement?

STATEMENT OF PAT LEONARD, DIRECTOR, OFFICE OF JUDGE ADVOCATE GENERAL, CLAIMS, INVESTIGATION, AND TORT LITIGATION

Ms. LEONARD. Good morning. I am Pat Leonard, and I am the director of the Claims and Tort Litigation Division at the Office of the Judge Advocate General of the Navy. I am here to answer your questions about the administrative claims process under the Federal Tort Claims Act and how it relates to these claims. I know you have a copy of my statement. I am not going to read that to you, but I would like to offer some additional information for your consideration. As of this date, we have received a total of 853 claims that allege either personal injury or death as a result of exposure to contaminated drinking water while living or working on board Marine Corps Base Camp Lejeune. The majority of the claims are from family members of former service members stationed at Camp Lejeune.

Included in that total number are 115 claims from civilian employees who worked on board the base. My written statement describes the administrative claims process in more detail, but I would just like to add that these claims involve some very complex scientific and medical issues. It is the Navy's intention to wait for the ATSDR study to be completed in order to insure that we have the best scientific research available so we may thoroughly evaluate each and every claim on its own merits. We truly believe this approach is in the best interests of both the claimants and the Department of the Navy.

Mr. STUPAK. That is your conclusion? OK.

Ms. LEONARD. Yes, sir.

[The prepared statement of Ms. Leonard follows:]

STATEMENT OF PAT LEONARD

The Department of the Navy, Office of the Judge Advocate General, Claims and Tort Litigation Division (OJAG Code 15), has been designated by the Secretary of the Navy as the office responsible for the adjudication of claims against the Navy and Marine Corps filed under the Federal Tort Claims Act (FTCA), as well as various other claims statutes. OJAG Code 15 also provides support to the Department of Justice (DoJ) and United States Attorneys for claims that result in litigation.

All claims alleging personal injury or death caused by contaminated drinking water at Marine Corps Base Camp Lejeune must be evaluated under the legal requirements of the FTCA. The FTCA is a limited waiver of sovereign immunity for claims against the Federal Government for personal injury, property damage, or death caused by the negligence of a Federal employee acting within the scope of his or her employment.

Administratively, the FTCA requires that a claimant first present a claim to the Federal agency alleged to have caused the injury before he or she may file a lawsuit against the United States.

- The claim must be presented in writing within 2 years after the claim "accrues" (i.e., knew or should reasonably have known they were injured as a result of government negligence) or the claim is forever barred.
- The claimant must allow the Federal agency at least six months to adjudicate the claim.
- If the Federal agency does not pay or deny the claim within six months, the claimant may file suit against the United States. Alternatively, the claimant may also choose not to file suit and wait for the Federal agency to adjudicate the claim.
- If the claim is denied by the Federal agency, the claimant must file suit within 6 months after the date of denial, or the suit is forever barred.

The Agency for Toxic Substances and Disease Registry (ATSDR), part of the Public Health Service, performed a Public Health Assessment pursuant to the requirements of CERCLA in 1997. ATSDR also conducted an Adverse Pregnancy Outcome Health Study in 1998. Although this research indicated that no health problems would be expected for adults, ATSDR could not rule out the possibility of an association between exposure to volatile organic compounds (VOCs) in drinking water at Camp Lejeune and adverse pregnancy outcomes. ATSDR has continued its study of former Camp Lejeune residents and is currently conducting an epidemiological study of children focusing on childhood cancer and birth defects. We have been informed this study is on-track to be completed in 2008.

To fairly adjudicate all claims based on available and appropriate objective information, we have decided not to adjudicate the claims until the ATSDR completes its study. Once completed, each claim will be independently adjudicated under the legal requirements of the FTCA to determine its merit.

In the meantime, while the scientific study is being conducted, we have been compiling information as claims are submitted. Each claimant receives a letter requesting specific information, including their medical records, as well as a survey to help ensure that we have all the information necessary for final adjudication.

The Navy's FTCA settlement authority is $200,000 per claim. However, when there are multiple claims arising from a single incident and payment will likely exceed the Navy's settlement authority of $200,000 in the aggregate, the Department of Justice must approve all settlements arising from the single incident. Therefore, once the claims are adjudicated, the DoJ must approve any payment if recommended by the Navy.

Again, it is very important to us, as well as the claimants, that we thoroughly analyze each and every claim utilizing the best scientific research available in order to fairly adjudicate them.

Mr. STUPAK. Dr. Sinks, your opening statement, please.

STATEMENT OF THOMAS SINKS, DEPUTY DIRECTOR, NATIONAL CENTER OF ENVIRONMENTAL HEALTH, AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY, ATSDR, ACCOMPANIED BY FRANK BOVE, SENIOR EPIDEMIOLOGIST, ATSDR, AND MORRIS MASLIA, ENVIRONMENTAL ENGINEER, ATSDR

Mr. SINKS. Good morning, Mr. Chairman, and members of the subcommittee. I am Tom Sinks, Deputy Director of the Agency For Toxic Substances and Disease Registry, or ATSDR. Dr. Frank Bove, our senior epidemiologist on the Camp Lejeune investigation, is sitting text to me. And next to him is Morris Maslia, our senior water system modeler. As a father of three young children, even though I am 56, I have a 13-year old and 11-year old and a 4-year old, I just wanted to comment on the moving and compelling testimony of the earlier panel. And as someone who has seen their own daughter go through medical procedures, I certainly understand some of the pain and powerlessness you feel when your child is affected. Our current work at Camp Lejeune concerns selected birth defects and childhood cancers, and we are also exploring the feasibility of additional studies, including adults.

Effective today, former Camp Lejeune Marines and their families can find out their exposure levels to PCE by visiting the ATSDR Web site and entering the dates they lived in Tarawa Terrace housing. ATSDR is examining two Camp Lejeune drinking water systems that served family housing and were contaminated with PCE or TCE between 1968 and 1985. A third system was not contaminated. The contaminated wells were shut down by 1985, several years before the current EPA maximum contaminant levels were established. Dr. Maslia's models—from his models we are confident that finished water from the Tarawa Terrace system was contaminated with PCE for roughly 30 years, beginning in 1957 and into 1987. The maximum simulated PCE concentrations in finished water exceeded 180 parts per billion, or 36 times the 1992 MCL established by EPA.

There were approximately 83,000 people exposed to this water from 1958 through 1985. Dr. Maslia has not finished his work on the Hadnot Point system, which was contaminated primarily with TCE. One tap water sample there measured 1,400 parts per billion, but we know that levels in finished water ranged substantially. There were approximately a thousand people exposed to Hadnot Point water from 1958 through 1985 who lived there. The third system supplied uncontaminated drinking water to families living at Holcomb Boulevard. We now know that housing in Holcomb Boulevard was built several years before the Holcomb Boulevard water system came on line in June 1972.

As a result, approximately one-fifth of the 56,000 people living in Holcomb Boulevard from 1968 through 1985 were likely exposed to TCE from Hadnot Point water. This discovery will not, and I repeat, not, adversely impact the current study, nor will it cause us to fail to include in the study any of the families or children who we collected information on. It does require us to reanalyze the completed study that has previously been published on adverse reproductive outcomes. That reanalysis will not begin until the current study is completed. In the meantime, we have placed an erratum notice on the ATSDR Web site and notified the journal that published the study of the error.

Camp Lejeune is unique for conducting a epidemiologic study of this type. The concentrations of TCE and PCE in the finished drinking water are extremely high. Thousands of people living in family housing were exposed to high levels of TCE or PCE. And importantly, thousands of others were unexposed. Our studies were intended to focus on the most vulnerable population, the unborn child. And we also had computerized birth certificates of over 12,000 live births on base. Finally, housing records were available that linked each family to TCE or PCE. We have contacted the parents of over 12,000 children who reported if their child was born with a birth defect or developed a childhood cancer of interest. Our team has confirmed the diagnosis of 57 of the 106 children who reported to us with conditions of interest. 42 additional children were either confirmed not to have the condition, parents refused to participate, or no medical records were available. This work is difficult. We are trying to accurately reconstruct systems and events as far back as 39 years ago. Nobody involved at the time could have foreseen the work we are doing today. Our work requires close collaboration with the affected families and individuals and agencies across DoD. I believe there is a shared commitment to accomplish this difficult task. Thank you.

[The prepared statement of Mr. Sinks follows:]

STATEMENT OF THOMAS SINKS

Mr. Chairman and members of the subcommittee, I am pleased to provide testimony on behalf of the Agency for Toxic Substances and Disease Registry (ATSDR) regarding our activities at U.S. Marine Corps Base Camp Lejeune (Camp Lejeune) in North Carolina. I am Dr. Thomas Sinks, Deputy Director of ATSDR and of the National Center for Environmental Health (NCEH) at the Centers for Disease Control and Prevention (CDC).

I will briefly summarize ATSDR's mission and general experience in addressing trichloroethylene (TCE) and tetrachloroethylene (PCE) at Superfund sites, including contamination of drinking water sources and supplies. I then will focus on ATSDR's scientific activities in evaluating potential health effects of exposures to PCE and TCE contaminated drinking water at Camp Lejeune, including conducting health assessments and epidemiologic research, and convening panels to obtain input from experts outside the Agency and from other persons concerned about potential health effects of exposures at Camp Lejeune.

I must preface my remarks with an important point: Since ATSDR has not completed its current epidemiologic study, we have not yet determined whether there is an association between exposure to contaminated water and certain birth defects and cancers among children born between 1968 and 1985 to women who lived at Camp Lejeune during some portion of their pregnancy. However, I will discuss findings that were released earlier today concerning contamination of the drinking water supply at one of the three areas of family housing at the Base.

BACKGROUND

ATSDR is a statutorily created Operating Division within the Department of Health and Human Services (HHS). Created by the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), more commonly known as Superfund, ATSDR's role complements those of the Environmental Protection Agency (EPA) and other Federal agencies under Superfund, by focusing on the health of people and the communities in which they live. Our work is framed into four functional areas: protecting the public from hazardous exposures, increasing knowledge about toxic chemicals, delivering health education about toxic chemicals, and maintaining health registries.

ATSDR is required by law to conduct a public health assessment (PHA) or its equivalent at each site proposed or listed on EPA's National Priorities List of hazardous waste sites. In a PHA, ATSDR evaluates releases of hazardous substances into the environment to determine if people are being or have been exposed to hazardous substances and, if they are being exposed, whether those exposures are at levels likely to be a health hazard. The PHAs also provide recommendations for eliminating or reducing harmful exposures. A PHA may also identify factual or scientific data gaps and make recommendations for additional actions such as health education, epidemiological health studies, disease registries, surveillance studies, or research on specific hazardous substances.

Under the 1986 Superfund Amendments and Reauthorization Act, HHS and the Department of Defense (DoD) are required to enter into a memorandum of understanding (MOU) regarding the manner in which ATSDR will carry out its responsibilities at DoD sites, and to establish a manner to transfer funds from DoD to ATSDR to fund these activities. Under the MOU, ATSDR sends an Annual Plan of Work to DoD each year, identifying planned work and funding needed for that work for the coming year.

ATSDR's primary health concern at Camp Lejeune involves potential exposure to drinking-water supplies contaminated with two common volatile organic compounds (VOCs): TCE and PCE. TCE is a colorless liquid which is used as a solvent for cleaning metal parts. Occupational exposure to TCE may cause nervous system effects, kidney, liver and lung damage, abnormal heartbeat, coma, and possibly death. Occupational exposure to TCE also has been associated with adult cancers such as kidney cancer, liver and biliary cancer, and non-Hodgkin's lymphoma. TCE in drinking water has been associated with childhood leukemia in two studies and with specific birth defects such as neural tube defects and oral clefts in one study.

PCE is a manufactured chemical used for dry cleaning and metal degreasing. Occupational exposure to PCE can cause dizziness, headaches, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, and death. Exposure to PCE-contaminated drinking water has been linked with adult cancers such as non-Hodgkin's lymphoma, leukemia, bladder cancer, and breast cancer.

Inhalation and ingestion are important routes of exposure for both TCE and PCE. Both chemicals are listed in the 11th Report on Carcinogens from the National Toxicology Program as reasonably anticipated to be human carcinogens. The United States Environmental Protection Agency (EPA) established Maximum Contaminant Levels for drinking water of 5 parts per billion (ppb) for PCE in 1991 and for TCE in 1987.

ATSDR has extensive experience related to TCE and PCE. The Agency has published Toxicological Profiles on both chemicals, and our Profile on TCE is included in our Case Studies for Environmental Medicine, a series of self-instructional publications designed to increase primary care providers—knowledge of hazardous substances in the environment and to aid in the evaluation of potentially exposed patients.

CAMP LEJEUNE

Public Health Assessments: In 1989, the EPA placed U.S. Marine Corps Base Camp Lejeune and ABC One-Hour Cleaners, which is located very close to the Base, on its National Priorities List. Releases of chemicals from both the ABC One-Hour Cleaners and activities at Camp Lejeune contributed to contamination of the water supply system serving certain areas of housing at the Base. In August 1990, ATSDR completed a PHA addressing contamination from the ABC One-Hour Cleaners. This assessment found that PCE, detected in on-site and off-site wells, was the primary contaminant of concern. In 1997, ATSDR completed a PHA for contamination from the Camp Lejeune Base.

In these PHAs ATSDR determined that current conditions at the site did not present a current health hazard because the contaminated wells were no longer in use. However, ATSDR did identify three past public health hazards. Of those, the one we are focused on currently is the contamination of drinking water systems serving several areas of family housing on Base, referred to as Tarawa Terrace, Hadnot Point, and Holcomb Boulevard. Tarawa Terrace was contaminated primarily by PCE and Hadnot Point was contaminated primarily by TCE. ATSDR also reported that Holcomb Boulevard, the third major system, was not contaminated, except for during a two-week period in late January and early February 1985 when the Holcomb Boulevard system was down for repairs and the area was served by the Hadnot Point system.

In 1997, ATSDR concluded that likely exposures to PCE and TCE were significantly below levels shown to cause adverse health effects in animal and adult human studies and therefore not expected to result in cancer or other health effects in adults. However, because scientific data relating to the harmful effects of VOCs on a child or a fetus were limited, ATSDR recommended conducting an epidemiological study to assess risk to infants and children from maternal exposure during pregnancy to the VOC-contaminated drinking water.

Health Studies: Following up on the recommendations in the PHA, ATSDR has undertaken two related epidemiologic studies, both of which focused on the health of children born from 1968 through 1985 whose mothers were exposed to contaminated drinking water at Camp Lejeune during their pregnancies. These dates were selected because 1968 is the first year for which computerized birth certificates from North Carolina are available, and in early 1985 contaminated water-supply wells were removed from regular and continuous service.

First Study: ATSDR's first study, completed in 1998, was based on information collected from the birth certificates of 12,493 live births on base. Housing records for families who lived on base were used to determine mother's residence during pregnancy and to assign VOC exposure categories based on our knowledge of contamination across the three drinking water systems. We identified an association between women who drank PCE-contaminated drinking water from Tarawa Terrace during pregnancy and their babies being born small for gestational age. This association was limited to those mothers older than 35 years of age or who had experienced two or more fetal losses. An additional finding was that baby boys born to mothers who drank TCE-contaminated water from Hadnot Point were also more likely than unexposed babies to be born small for gestational age.

Second Study: In its PHA ATSDR also identified as a priority the need to study the relationship between maternal exposures to TCE and PCE and the occurrence of several birth defects and childhood cancers, which would require information beyond that available in birth certificates. The current study began in the late 1990's and is ongoing. The study protocol for the study has been subjected to peer review by scientific experts outside of the Agency. The two primary components of the current study are to identify and confirm particular birth defects and cancers and to conduct water modeling to determine which housing units received contaminated water during what time period and the level or concentration of the contaminated water.

The study initially focused on neural tube defects (i.e., spina bifida and anencephaly), cleft lip and cleft palate, major heart defects, choanal atresia, and two forms of childhood cancers (all leukemias and non-Hodgkin's lymphoma). ATSDR contacted the parents of 12,598 children born during the period 1968–1985 to mothers who resided at the base anytime during their pregnancy to confirm mother's residence and determine if the child had one of the health conditions that are focused on in the study. Parents reported 35 children with neural tube defects, 42 with cleft lip and/or palate, 29 with leukemia or lymphoma, no children with choanal atresia, and 3 with a major heart defect (this condition was dropped because of the small number of possible case-children).

Since the initial phone interview, ATSDR has collected medical records to confirm the diagnoses of the reported cases. Fifty-seven children confirmed as having a condition of interest include 17 children with a neural tube defect, 24 children with a cleft lip or palate, and 16 children with leukemia or non-Hodgkin's lymphoma. An additional 42 possible case children were either confirmed not to have the condition,—refused to participate, or had no available medical records. The status for an—additional 7 children is still pending. As noted earlier, the information on birth defects and cancer does not, by itself, tell us whether these conditions are associated with exposure to contaminated water.

To obtain estimates of historical concentrations of PCE at Tarawa Terrace and TCE at Hadnot Point, ATSDR is using water-modeling techniques and the process referred to as historical reconstruction. ATSDR began these analyses in 2003. The historical reconstruction process for Tarawa Terrace is complete. Water modeling activities for the other water system, the Hadnot Point system, are expected to be completed later this year.

ATSDR's goal is to estimate monthly levels of contaminants in these drinking water systems from the early 1950's until the contaminated wells were shut down in 1985. The effort involves extensive information gathering (e.g., geohydrology, sources of contamination, drinking water well locations and pumping rates, contaminant transport and degradation byproducts, and water distribution system). The modeling effort also requires simulating the fate and transport of the contaminants from the pollution sources through the soil and into the ground water, to the drinking water wells, and finally to the water treatment plant and water distribution system that provides the water to the family housing units. After the historical reconstruction of both water systems is complete, the information on birth defects and cancers will be linked to the information concerning which housing units received contaminated water during what timeframes.

The historical reconstruction of the Tarawa Terrace system is summarized in an Executive Summary report we released earlier today. The results indicate that PCE-contaminated drinking water distributed to family housing units at Tarawa Terrace exceeded 5ppb, which in 1991 was established as the Maximum Contaminant Level, for the first time during the period October 1957–August 1958, with the most likely date of first exceedance being November 1957. The maximum PCE concentration in drinking water delivered to family housing units was estimated at 183 ppb in March 1984. During the period November 1957–January 1985, PCE levels in the finished water at the water treatment plant exceeded 5 ppb for every month except when the most contaminated well was off-line twice for repairs (a total of 4 months). The contaminated wells were removed from regular service in February 1985. Effective today, former Camp Lejeune Marines and their families can find out their estimated exposure levels to PCE and PCE degradation by-products, calculated through modeling, by visiting the ATSDR Web site *www.atsdr.cdc.gov/sites/lejeune* and entering the dates they lived in Tarawa Terrace housing. The executive summary of the analyses also is available at this Web site.

Once the historical reconstruction of both the Tarawa Terrace system and the Hadnot Point system have been completed, the monthly quantitative estimates of contaminant concentrations in each of these drinking water systems will be linked with the case-control interview data on birth defects and childhood cancers. ATSDR will analyze the data to determine if exposures to the drinking water contaminants are associated with neural tube defects, cleft lip/cleft palate, or childhood leukemia/non-Hodgkin's lymphoma.

Update of First Study: During the work conducted for the historical exposure reconstruction, ATSDR discovered an error in the exposure classifications used in its first Camp Lejeune study, the 1998 study of adverse birth outcomes. This may have affected the results of this study. The error was the result of a lack of information on the date the Holcomb Boulevard Treatment Plant began operation. The study assumed that the plant was operating during the entire period of the study, 1968–1985. However, as a result of the historical exposure reconstruction, the Agency has learned that the Holcomb Boulevard Treatment Plant did not begin operation until June 1972. Prior to June 1972, the Hadnot Point system provided drinking water to the Holcomb Boulevard service area. This means that many of the births during the period, January 1968–May 1972 that were classified as unexposed in the 1998 study were actually exposed in utero to drinking water contaminated with TCE and other solvents. ATSDR regrets the error that was made in the 1998 study, and plans to reanalyze the 1998 study using the monthly contaminant estimates from the historical exposure reconstruction. Utilizing the more detailed estimates will considerably improve the quality of the 1998 study.

Community and Expert Input: In response to public concerns that ATSDR's study was too narrowly focused since drinking water contamination may have caused adult cancers as well as non-cancer diseases among children and adults, ATSDR convened a scientific panel in February, 2005, to provide advice on whether additional epidemiological studies on the health effects of exposures to contaminated water at Camp Lejeune should be conducted. ATSDR accepted panel recommendations, including recommendations to establish a Community Assistance Panel for Camp Lejeune, and to assess the feasibility of conducting a mortality and cancer incidence study and additional potential studies by evaluating DoD databases.

ATSDR also convened a panel on its approach to historical reconstruction of groundwater and finished water contamination at the Base. On March 28–29, 2005, ATSDR held an "Expert Peer Review Panel on Water Modeling" to assess and review water modeling approaches and activities at Tarawa Terrace, Hadnot Point, and Holcomb Boulevard. Panel members approved ATSDR's approach but made additional recommendations, which we adopted. They were unanimous in their recommendation that ATSDR conduct additional extensive data discovery to obtain all the information necessary to fully understand the historical operations of the water-supply systems. Panel members also recommended that the Agency undertake a rigorous uncertainty or probabilistic analysis and consider modeling PCE degradation by-products. Lastly, the panel recommended that a more simplified approach to water-distribution system modeling could be used (i.e., simple mixing model), unless we could definitively prove—using historical information and data—that there were lengthy periods (exceeding several months) when the Tarawa Terrace water-distribution system was interconnected with the Holcomb Boulevard water-distribution system. These recommendations were accepted by the Agency and were implemented.

CONCLUSION

In summary, ATSDR has an essential role in providing public health support to people and communities impacted by hazardous substances. ATSDR expects the study on the association between health effects and exposure to the drinking water contaminants to be completed in 2008. Our assessment of the feasibility of additional work is expected to be completed this year. On a personal note, my staff and I have truly enjoyed interacting with the former Marines who lived at Camp Lejeune. As an Agency, we take very seriously the trust placed in our organization by members of the public like these former Marines.

At this time, I am happy to answer any questions you may have.

ANSWERS TO SUBMITTED QUESTIONS BY MR. GREEN

Question: Mr. Sinks, in your testimony, it states that the Agency for Toxic Substances Disease Registry (ATSDR) has conducted studies on children that may have been exposed to trichloroethylene (TCE) and tetrachloroethylene (PCE) at Camp Lejeune. Has ATSDR considered studying adults who may have been exposed to TCE and PCE at Camp Lejeune?

Answer: ATSDR's current and previous epidemiological studies at U.S. Marine Corps Base, Camp Lejeune have focused on the health effects to the fetus and child from maternal exposures to drinking water contamination because the fetus is the most vulnerable to these exposures and because there are only a very few studies that have evaluated the effects on the fetus of trichloroethylene (TCE) and tetrachloroethylene (PCE) exposures. Because of this gap in our scientific knowledge, and because the fetus is the most vulnerable to these exposures, ATSDR studied specific health effects in children that may be associated with maternal exposures to these drinking water contaminants. ATSDR is currently evaluating the feasibility of conducting a study of adult mortality and cancers among a cohort of Marines who were stationed at the base during the period when the drinking water was contaminated with TCE and PCE. The assessment of the feasibility of such a study will be completed by the end of 2007.

Question: In the studies that ATSDR has conducted, you have contacted the parents of children that have been exposed to TCE and PCE at Camp Lejeune. If you can contact those people to ask them to participate in a study and create a registry, then why not notify everyone who may have been exposed to water contamination at Camp Lejeune?

Answer: ATSDR does not have access to data on everyone who may have been exposed to water contamination at Camp Lejeune. The Department of Defense is the agency that may have data on this population. For the study ATSDR is conducting, we have been able to contact many of the parents of children whose mothers were on base during pregnancy. This sub-population does not cover the entire population of those who may have been exposed, but ATSDR does plan to provide study participants with the results of our findings.

Another aspect of the agency's work is conducting water modeling to determine which housing units at Camp Lejeune received contaminated water during what time period and the level or concentration of the contaminated water. ATSDR has posted to its Web site a summary of the findings from its historical exposure reconstruction work and also the full technical findings. These are available at *www.atsdr.cdc.gov/sites/lejeune/watermodeling.html*

We have publicized the availability of these data by issuing a press release, and we are working closely with the Community Assistance Panel to identify other methods of effective outreach to the affected community concerning ATSDR work. Similar outreach efforts will be undertaken for the study results when they are available.

Mr. STUPAK. Dr. Bove, were you going to have an opening statement? Dr. Maslia?

Mr. MASLIA. No.

Mr. STUPAK. All right. Then we are going to move to 10-minute questions then. On this panel, we are going to do 10 minutes. I will begin. Dr. Sinks, did you say you are going to do an adult study? That's in the planning works for Camp Lejeune?

Mr. SINKS. Yes. Thank you. We have not committed to do an adult study. A decision was made to do the childhood study because the data gaps were greatest in that area. We wanted to look more closely at the most vulnerable population, and we had records to do that.

Mr. STUPAK. I thought you said in your opening——

Mr. SINKS. We are doing a feasibility study right now.

Mr. STUPAK. Feasibility study to do determine if there should be a study?

Mr. SINKS. To determine if we should or should not move ahead to do a study of adults. That is correct.

Mr. STUPAK. And when you do your studies areas you are looking at what? From what year, 1968 to 1985?

Mr. SINKS. We define the study beginning date as 1968. Now that is for the children. And that was decided on the basis of the availability of computerized birth certificate records, so we wouldn't have to go back and contact all of the families before 1968 in order to determine who there might have been.

We cut the study off in 1985 because the information we had at that time was exposure had stopped in 1985.

Mr. STUPAK. You are aware that these wells were used through 1987?

Mr. SINKS. Dr. Maslia's work with Tarawa Terrace shows us that there may have been some much lower contamination in the finished water from 1985 through 1987. I think you have a chart that shows that. It may be a little difficult to read, but the levels are significantly lower. These are not sampled.

Mr. STUPAK. More than 5 parts per billion?

Mr. SINKS. A little more than 5. Possibly somewhere between 5 and 10, but certainly nowhere approaching the levels of 180 which we saw prior to 1985.

Mr. STUPAK. So you don't dispute the fact that the wells were used up through 1987? But you are cutting the study off in 1987.

Mr. SINKS. Well I am not an expert. There were some wells used. The two primarily contaminated wells were shut off. I think one of them may have been used in a mixture for a short period of time.

Morris, if you want to answer that.

Mr. MASLIA. Yes. The two primary contaminated wells known as TT–26 and TT–23 were shut down from continuous use.

Mr. STUPAK. But used periodically after——

Mr. MASLIA. If they have to obtain a water sample, you have to turn the wells on, so they would turn them on. There was a period in April that they turned TT–23 on for 7 hours, for 7 different hours but they were not used continuously. Those two wells were not used continuously. All the wells were shut down when the treatment plant was shut down in March 1987.

Mr. STUPAK. OK. Dr. Sinks, I asked Dr. Gros about miscarriages. Have you looked at miscarriages during that period of time from 1968 to 1985?

Mr. SINKS. We did use adverse reproductive outcomes using birth certificates, so we limited that first study to a study using available vital statistics.

Mr. STUPAK. So the answer is no, you didn't look at miscarriages?

Mr. BOVE. We did look at fetal deaths. Using fetal death certificates we found 83 fetal deaths during that period. We expected, based on the ratio of fetal deaths to live births, about three times more than that. So the fetal death certificates from North Carolina were seriously underestimating or under-ascertaining the fetal deaths occurring in that population. I don't know why that was the case. That would be something for North Carolina to answer.

Mr. STUPAK. How many fetal deaths versus how many women did you look at?

Mr. BOVE. We decided not to pursue the fetal deaths because we saw that we were under-ascertaining them by a factor of I think 3. We didn't know why we were seeing so few fetal deaths in this population, OK, so if we did a study we would have to figure out why, for example, the fetal death rate was so slow.

Mr. SINKS. Based on a proportion of live births?

Mr. BOVE. That is based on a proportion of fetal deaths to live births. You expect a certain portion of fetal deaths given the number of live births in a population.

Mr. STUPAK. Looking for a number of fetal births compared to the rest of the country, not necessarily when you have a large concentration in a population, why wouldn't you look at another part of the country?

Mr. BOVE. In the study, they look at adverse reproductive outcomes, and in the current study too. They are looking at comparing those exposed at the base to those unexposed at the base. That's the idea. We want to see if contamination levels are associated with these outcomes. So if you compare it to some other base, we'd have to get birth certificates and fetal deaths from another base. It's not clear—we would have to figure out whether there were exposures occurring at another base. It made sense to limit the studies to Camp Lejeune.

Mr. STUPAK. How about the 12,598 children that were born between 1968 and 1985? Did you take into consideration if those children died?

Mr. BOVE. Did we take into consideration the children died?

Mr. STUPAK. Right. You said you looked for birth defects and that, from 1968 to 1985.

Mr. BOVE. Right. Some of those children did die.

Mr. STUPAK. What percentage?

Mr. BOVE. I will have to get back to you on that one.

Mr. STUPAK. More than the national standard?

Mr. BOVE. No. We didn't look at that.

Mr. STUPAK. In your study when you make these comparisons, these conclusions, you are comparing against different DoD bases?

Mr. BOVE. No. We're comparing exposed—mothers exposed at Camp Lejeune to mothers unexposed at Camp Lejeune. What you want to do in an epidemiologic study is to have two comparable groups, an exposed and an unexposed, so they are similar in all respects, if you can, except for the exposure.

Mr. STUPAK. The only way you determine whether exposed or unexposed is whether they had water from these wells.

Mr. BOVE. Right.

Mr. STUPAK. So if they are swimming at the Tarawa Terrace swimming pool but they didn't drink the water there, then you are unexposed?

Mr. BOVE. Right.

Mr. STUPAK. But if you are a pregnant lady, you certainly could be exposing your child while you are in that swimming pool, is that right?

Mr. BOVE. There are other exposures too. You pump gas. There are all kinds of exposures. What you try to do is compare two populations that are similar, OK, and the population in Tarawa Terrace and the population of Holcomb Boulevard——

Mr. STUPAK. Why don't you just——

Mr. BOVE. Can I finish?

Mr. STUPAK. Sure. But you don't get 10 minutes to answer because that's all I have to question.

Mr. BOVE. One second. The populations there are similar, we hope. And this is how epidemiologic studies are done. We hope they are similar in all other risk factors except for the exposure of interest.

Mr. STUPAK. What's the percentage of birth defects at Camp Lejeune of those 12,598 compared to the rest of the country?

Mr. BOVE. We don't have the data on all birth defects at Camp Lejeune. We just focused on those birth defects we were interested in based on previous studies.

Mr. STUPAK. So if someone says birth defects are 15 times greater than the rest of the Nation, you have no way to dispute that.

Mr. SINKS. May I just interject here on a couple of things? We do have information on the numbers of children who reported to us with birth defects from those 12,000, because in fact we went out and interviewed all of those parents. We collected that information. We did have priorities in terms of which were the conditions we were most interested in because of previously published scientific studies. Those were the ones we focused on.

We did find there were a couple conditions we were interested in where we had insufficient numbers of children who were born with those birth defects; and in fact, one of those conditions we actually saw less than we would have expected based on national data.

What Frank was saying regarding fetal deaths as a proportion of total live births is not a comparison internal to Camp Lejeune. That's a comparison based on what nationally——

Mr. STUPAK. I realize that. I guess what I'm trying to say, if you are at Camp Lejeune, how can you sit here and say this person was exposed, this person was not exposed? They go over to someone's house and not have a drink of water?

Mr. SINKS. Let me just say this. There is no question that there are other folks at Camp Lejeune we're not studying who were exposed. And if your question is essentially one of have we included in our studies everybody who was potentially exposed, the answer is no.

But part of that answer has to do with how do we do epidemiologic studies? How do we do it in a timely way? Because I don't think you want us to be here in 5 years and——

Mr. STUPAK. You are telling us you won't have that report done until next year now, right?

Mr. SINKS. We will probably have it done, I'm hoping, early 2008. It is a difficult thing to do. The water modeling is a particularly difficult thing to do, and the Hadnot Point system is what we have to do.

Mr. STUPAK. Of these 12,598 children born between 1968 and 1985, you've talked to all these parents?

Mr. SINKS. Well, I haven't personally. But the people working for us have interviewed—was it the total? Was that 12,000?

Mr. STUPAK. So someone talked to Mr. Gros, then, who was in the first panel?

Mr. SINKS. I believe all three of them had been contacted by us. Let me just point out, that's why they found out about the issue.

Mr. STUPAK. All right.

General Dickerson, I assume your opening statement that DoD refused to fund between 1998 and 2000, that's our activities at Camp Lejeune. Why was that, do you know? You have to use your mike, please, sir.

General DICKERSON. I'm sorry sir. The 1998 funding for ATSDR activity provided by the Department of the Navy was handled by the Navy because it goes to the Secretariat level for the defense environmental restoration program moneys. After that was not funded—and the Marine Corps has stepped up and it's funded it out of our accounts right now—we are not at the Secretarial level.

Mr. STUPAK. So you have no idea what happened between 1998 and 2000?

General DICKERSON. No, sir. I do not.

Mr. STUPAK. Do we have to get the Secretary of the Navy in here to answer that question then?

General DICKERSON. His staff has the background on how that was appropriated. Yes, sir.

Mr. STUPAK. OK, we can do that. My time has expired.

Mr. Whitfield for 10 minutes. I think we'll be coming back.

Mr. WHITFIELD. Well, thank you for your testimony.

Dr. Sinks or Ms. Leonard, either one. On the earlier panel I referred to the 2003 study of ATSDR in which it said that ATSDR has determined that exposures to volatile organic compounds in on-base drinking water is unlikely to result in cancer and noncancer health effects in adults.

Now, how do you all come to that conclusion?

Mr. SINKS. I think this one's for me. This was the 1997 health consultation that we published on Camp Lejeune, and it basically characterized what our health assessors saw in terms of exposure levels, potential pathways, and tried to look at the duration of exposure, the concentration of exposure, and compare that with existing scientific literature that was out there. Those individuals who were doing that made a conclusion that they did not expect to see cancers in adults.

However, I will tell you that as a carcinogen, there is no threshold dose to where we would or wouldn't know a cancer had occurred. And we wouldn't conclude that no cancers would have occurred on the basis of that.

I'm sorry. I kind of lost my train of thought there. But we did make the decision to go ahead and study it in adults because we had previously—you showed some data on Woburn—that was a study that we were involved in, and that did indicate some risks to childhood cancers, and we wanted to follow up with that, and we felt that this was the proper place to do that.

Mr. WHITFIELD. It's a little bit surprising, I guess, to hear that sort of determination, saying that it is unlikely to result in cancer, particularly since these wells—and water was coming from these wells from 1968.

Mr. SINKS. Mr. Whitfield, let me say that what hasn't been mentioned is that the health consultation does indicate that a past public health hazard had occurred, and that we clearly stated this was a past public health hazard. Now the individuals were looking, then, at would we have expected to see certain health outcomes, and they made the conclusion they didn't expect to. But they clearly did indicate that there was a past public health hazard presented by this exposure.

Mr. WHITFIELD. OK. You are saying there was a health hazard. But it's unlikely that it would have caused cancer?

Mr. SINKS. That was their conclusion at the time. But I will say that as a carcinogen with no threshold dose, we probably should be cautious about concluding that no cancers did occur. There may have been some cancers. I can't tell you if there were or there were not. But I'd also tell you that epidemiology would not be able to tell you if any individual's cancer was due to this——

Mr. WHITFIELD. If I'm a plaintiff's lawyer, I'm sure that I can come forth with scientific evidence and would make the argument that it did cause cancer. I mean that wouldn't be surprising to you that we would be able to find evidence to that effect, would it?

Mr. SINKS. Well, I think these chemicals are reasonably anticipated to be human carcinogens. That's well documented. The issue becomes one of duration and dose, and at what dose we see that. And I think the human epidemiology at the time was mostly focused on adults in occupational settings where their exposures are much greater.

Mr. WHITFIELD. We were talking about 2003, and you made the statement that in 2003 there was a position, and you've sort of made me think that maybe you are rethinking that. But in this report that was issued today, the Executive Summary, it says on page ES–3, thus ATSDR determined that exposure to VOCs in on-base drinking water was unlikely to result in cancer and noncancer health effects in adults.

Mr. SINKS. Well, that's quoting our 1997 public health hazard. Those were the conclusions of the people doing that health assessment. And again I want to repeat, while we use the word "unlikely," which is low probability, it doesn't mean they would not could not have occurred. We would not be able to exclude that possibility.

Mr. WHITFIELD. Well, Ms. Leonard, you are in charge of administering the 850-some claims filed by personnel at Camp Lejeune who are seeking damages, and in your testimony you state you are waiting for ATSDR to complete its study before you take action on the claims.

Ms. LEONARD. Yes, sir.

Mr. WHITFIELD. It seems to me they're taking the position here that there's no correlation here. Is that what you think?

Ms. LEONARD. Are you speaking only about the adults?

Mr. WHITFIELD. Yes.

Ms. LEONARD. Yes. It does sound like that. We are waiting particularly for the water modeling part of the scientific study so that we can figure out what doses, during what time periods, at what housing areas, what levels, and when the medical piece comes through, we'll draw the correlation between specific illnesses or injuries at that point.

Mr. WHITFIELD. Have you filed any medical claims on behalf of children?

Ms. LEONARD. We have not at this point.

Mr. WHITFIELD. When do you expect that some decisions will be made on children's issues?

Ms. LEONARD. As soon as we get the water modeling. I believe part of that was just released. I have not seen that nor have I been briefed on it. When the entire modeling is released and then the medical evidence tying particular illnesses or injuries to those levels of exposure, at that time we will adjudicate that group of claimants that are claiming about those particular illnesses.

Mr. WHITFIELD. What would you say of the time line on all of this would be? Or maybe Dr. Sinks could help or someone could help.

Mr. SINKS. The Tarawa Terrace study is complete and it's out today. The Hadnot Point piece is not completed. Mr. Maslia believes it will be done later this summer or in the fall, and the "epi" study which will be connecting the childhood conditions with these exposures would be sometime I hope in the spring.

Mr. WHITFIELD. Now these are being followed under the Federal Tort Claims Act?

Ms. LEONARD. Yes, sir, they are.

Mr. WHITFIELD. And you all make the initial administrative decision?

Ms. LEONARD. Yes, sir. Once a claim is filed, the law requires that the claimant allow the agency 6 months to adjudicate the claim. And when the 6-month time period expires, at that time they are able to go into Federal District Court to go sue the United States of America.

Mr. WHITFIELD. So you would make a decision then, and they would go to Federal court and contest that decision?

Ms. LEONARD. They could go now if they wanted to, because the 6 months has expired since the claims were filed, the majority of them. So they could go now if they wanted to. The claimant always has the right to allow the agency more time to adjudicate the claim, as in this case, it's been more than 6 months. It's been years on many of them. So we are waiting for the further evidence to adjudicate those claims.

Mr. WHITFIELD. All right. Dr. Sinks, not too long ago, Ranking Member Barton and I sent a letter to you all talking about other military bases. And in some of the data that you provided back to us as answers—could you all put on the monitor this table regarding the HazDat Databases on Nebraska Ordnance Plant, Mather Air Force Base. It's hard to read that. But tab 21.

Mr. SINKS. This is what we sent you yesterday.

Mr. WHITFIELD. Yes. On tab 21, we specifically talked about five bases: Nebraska Ordnance Plant, the Mather Air Force Base, the Air Force plant No. 4, McClellan Air Force Base, and Wurtsmith Air Force Base. And your response, according to the documentation that we have, was wrong in three out of five of those facilities. The data in the HazDat Database was wrong in three out of five. Were you aware of that?

Mr. SINKS. We spoke with your staff yesterday about this. Let me say that your request came to us late Friday afternoon. It was a list of many bases, and asking us to respond to you in detail, I believe, around the 26th. We were asked to look at the five specific bases, and we did find that some of the numbers in there may not have fit a category that certainly I would have expected them to fit. I will not tell you that means they are necessarily wrong.

The system that you are describing, HazDat, was a system designed in 1991. It was specifically designed not for us to use to identify places where we would do human health research, but it was designed as a tool to provide individuals and communities information that they might readily access through the Internet about a site of interest. What we have is a list that you've come up with of several bases. I don't know how many—20, 30.

Mr. WHITFIELD. Well I think we want to get with you after this hearing, because the evidence shows quite clearly that the response was wrong, your response was wrong.

Mr. SINKS. Let me say there very well may be some errors in some of the data in HazDat, which contains hundreds of thousands of data bits and thousands of sites over 20 years of ATSDR involvement. The issue of how do we identify those sites where TCE is exposing large numbers of people where we might want to do health studies is not one where we would necessarily rely on using that interbase tool.

So yes, there are things we should be doing with HazDat to correct it. We have been trying to put it on a new platform and to correct some of those things. But it does not surprise me that we could find one or two errors in there, or more, or the interpretation of them.

Mr. WHITFIELD. Well, I think the thing is, we're focusing on Camp Lejeune today. But we know that there are at least 22 other military bases around the country with some contaminated water. And in this—just taking the Nebraska ordnance plant, it says 630,000 parts per billion of TCE in municipal public groundwater contamination. And in the response it says that there was less than 700 parts per billion.

Mr. SINKS. Well let's split the difference here between what may be inaccurate with HazDat and how we can identify other places to do research on TCE. There are two different issues. Let me say we have done human epidemiologic research on other areas involving TCE, several of them non-DoD sites. So the work that was done in Woburn involved that. We've been involved in any number of human health studies. This particular error that you are looking at was apparently a transpositional error by an abstracter who looked at a value of PCBs—no TNT in soil at this ordnance plant and somehow put it in as TCE.

Mr. WHITFIELD. Well, I mean, you all are called to a high duty of responsibility and accuracy here, because when we have military men and women serving our country and they have their families with them, they expect, certainly, safe water to drink. And I think what's happened at Camp Lejeune is a real blight on all of us, and the fact that 22 other military bases have been identified with problems as well calls this to a very high standard. And I think that's what these hearings are all about.

And I want to commend the Chairman once again for holding the hearing and it's something we will continue to look at. And I think my time has expired.

Mr. STUPAK. Mr. Walden, please.

Mr. WALDEN. Thank you, Mr. Chairman. I am going to yield 2 minutes to my colleague from Texas who has some specific questions involving Texas, and then I will have some questions.

Mr. BURGESS. I thank my friend for yielding. I apologize for having missed part of this hearing. We have several hearings going on at the same time.

Dr. Sinks, on the list of 20 that Ranking Member Whitfield was just referring to, the top of that list is the General Dynamics plant in Fort Worth, Texas, with a reported contamination with trichloroethylene of 11,000 micrograms per liter. If I do the math right, that's 11 milligrams per liter. That's a strikingly large amount. Can I just ask what is being done currently? Is this the current situation that exists at these other installations?

Mr. SINKS. That report, I believe, particularly identified that level, but not at tap water where people were drinking. I believe that we did not indicate a public health hazard from TCE exposures at that site. Most of these sites I think, were involved where these levels exist. There is not ongoing exposure because they've documented the exposure and they've taken corrective action.

Mr. BURGESS. Not to interrupt, but that's my biggest concern. We're doing something presently to keep ongoing exposure from happening, particularly at these wells or these sites that seem to have alarmingly astonishingly high levels.

Mr. SINKS. Absolutely.

Mr. BURGESS. And are we also in the process of notification of individuals who might have been exposed? Because this is likely something that's been going on for some time.

Mr. SINKS. Our agency makes it a very specific practice to make sure our information is available. When we have a community that is currently there, we work very directly with the community to educate them on what we've found and provide them that information. We would have difficulty having to go back to people who were essentially in a military base and then left that base in terms of tracking them down and providing them that information on a one-by-one basis. We do make our information readily available publicly, but it's on the Web and that type of——

Mr. BURGESS. General Dickerson, I realize this is the Air Force and not the Marine Corps. But would the military have the ability to access those records and be able to participate in information dissemination if that appeared to be necessary?

General DICKERSON. Sir, I couldn't answer for the Air Force. But I would hope that OSD and the other services have these records available for review, but I cannot testify to this committee that those records are available.

Mr. BURGESS. Well, Dr. Sinks, I will just echo what Mr. Whitfield said. I encourage you to get that information to the committee so we can make an informed judgment about that. And I thank Mr. Walden for yielding. I will yield back my time.

Mr. WALDEN. Thank you, Dr. Burgess. I appreciate your participation in the committee.

Dr. Sinks, I want to ask you, if you had been on these bases, especially Camp Lejeune, at the time that these other gentlemen were there, would you have felt—and known about the contamination—would you have felt comfortable drinking that water?

Mr. SINKS. Well, I think that I personally would have been using different water and I think that I would have been recommending that an alternative water source was used at that time.

Mr. WALDEN. And I think most of us—all of us—I don't know anybody that would say the opposite of that. The question then becomes: Where the database indicates that there were similar higher levels or different levels around the country and that we had men and women in uniform on bases consuming that water, doesn't it make sense then to look at those folks and do an epidemiological study?

Mr. SINKS. Thank you for the question. For us to do an epidemiologic study there needs to be a number of things available to us. One, we wouldn't do an epidemiologic study unless we were convinced there was a completed pathway of exposure and there were people actually exposed. Usually in environmental epidemiology this issue of trying to determine who was exposed, who wasn't exposed, is, frankly, the most difficult thing to determine.

Mr. WALDEN. If I can just interrupt you a second, because I don't do what you do.

Mr. SINKS. And I don't do what you do.

Mr. WALDEN. Well, you may be better off then. In Fort Riley, there are 2,550 people that have been identified, estimated exposed population at 330 parts per billion BCE and 96 parts per billion of TCE. Does anybody know who those 2,550 people are?

Mr. SINKS. I would not know.

Mr. WALDEN. Does anybody in your agency know?

Mr. SINKS. We would not generally collect personal identifying information unless we were going ahead to do an epidemiologic study, and then we have a burden to very closely protect that information in confidentiality.

Mr. WALDEN. I understand. I guess what I'm trying to get at, how do we take care of the people who may have been exposed? How do we determine if there's a connection here and how do we get them help if there is? And it sounds like you can't do that. Is that correct?

Mr. SINKS. There are things that I can do.

Mr. WALDEN. What can you do?

Mr. SINKS. I can do a health consultation and determine if there was a completed pathway.

Mr. WALDEN. What does that mean, completed pathway?

Mr. SINKS. Well, that simply is reviewing the available information to determine if a contaminant in air, water, soil, food, was at a level that would have constituted a health risk and people actually consumed it or inhaled it.

Mr. WALDEN. Sure. And I understand that. But at 330 parts per billion of BCE, does that constitute that pathway if one of these——

Mr. SINKS. It would if it's in our drinking water at the tap. Now, let me point out that there are other issues for when you would do a study. You would do a study if you had sufficient numbers to study and you know who they are, and you have the ability to track them, and you can identify specific health outcomes that they may have had. And that can be a very difficult thing when we're going back 10, 20 years to try to reconstruct that history.

Mr. WALDEN. All right. I'm sure it is.

Mr. SINKS. Let me give you one example. If we did find a very high level in a well off base that was exposing a family, our recommendation would be to get them alternative water.

Mr. WALDEN. Right.

Mr. SINKS. Our recommendation would not be to do an epidemiologic study. We would not do a study of a single family, or even 20 families, because we wouldn't have enough people to study.

Mr. WALDEN. OK. With 2,550 families or individuals?

Mr. SINKS. It could be, if we also had an appropriate control group who were unexposed and we were able to identify who those people were, and we knew what the health outcomes we were looking for were, and we had the availability to get information on that.

Mr. WALDEN. I guess what I'm struggling with—and I'm probably not alone—it seems like we would err on the side of the men and women in uniform, that we would be doing everything possible to contact every person who was on these bases and to find out if there is this connection.

And I may be not hearing you correctly, but I get the sense that we're not making that effort; that there aren't enough people, there aren't enough people sick, we don't know about a pathway yet. We have this database that shows pretty high levels of concentration of these chemicals in the water. Am I missing something here?

Mr. SINKS. Let me separate out this issue of why you are wanting to go back and contact those individuals.

Mr. WALDEN. Right.

Mr. SINKS. For a specific reason.

Mr. WALDEN. Right.

Mr. SINKS. Versus needing to do an epidemiologic study. The study we're doing at Camp Lejeune right now looking at these birth defects should be very sufficient to tell us whether or not levels of exposure in this range are associated with risk, with these conditions, and we wouldn't make a recommendation to go out and look at every single instance when that occurs. We want to inform the science. We want to learn from it.

Mr. WALDEN. So you would use the science from that study and apply it across——

Mr. SINKS. Right.

Mr. WALDEN. Are there already epidemiologic studies, already done outside of the military application, involving these chemicals in drinking water?

Mr. SINKS. Yes, there are.

Mr. WALDEN. What did they show?

Mr. SINKS. Actually, let me ask Frank to talk about Woburn and the other studies that he's done.

Mr. WALDEN. Did they show a connection and the pathway that Dr. Sinks——

Mr. BOVE. There have been two studies that looked at childhood leukemia and these chemicals specifically: Woburn, which we funded; and a northern New Jersey study which I participated in, and was funded also by ATSDR. In both studies, trichloroethylene was associated with childhood leukemia. The only wrinkle here is that in Woburn most of the cases were males, and in the New Jersey study, the excess was—it was entirely in females. So we don't understand what that is all about.

But there's also been a study done of birth defects and TCE and PCE. That's a study I did in northern New Jersey. That was also funded by ATSDR and I found associations there between trichloroethylene and neural—two defects and oral clefts. That's why we're studying them at Camp Lejeune. As for PCE, it was much fuzzier and not clear, but there seemed to be an association with oral clefts, cleft lip and cleft palates, so that's another reason we are looking at those end points there.

Mr. WALDEN. So from the studies you've done or the science you've studied, the information you've seen from perhaps other studies, would it be reasonable for somebody like me to conclude that if there are certain levels of these chemicals in the water that was consumed by men and women in uniform, or anybody anywhere, that that's a likelihood they could come down with the diseases, or their kids could, that we heard about from the first panel?

Mr. BOVE. The problem here is that both the New Jersey study that I worked on, both studies, and the Woburn study are still in dispute of what they show. There are, of course, industry people that will say that they are not sufficient to show anything. So there is this dispute and controversy in the scientific community.

Mr. WALDEN. Should there be other studies done?

Mr. BOVE. Absolutely.

Mr. WALDEN. Would you recommend that studies be done on people from these other bases?

Mr. BOVE. We want to do credible studies, though, because if we don't do a credible study, a strong study, they won't provide the evidence we want. We have to pick exposure, those situations where there's good exposure data, and there also has to be a large enough number.

Now, if you remember, there are 12,000 or so births we looked at at Camp Lejeune. And at the end of the day, we have relatively small numbers of cancers and birth defects to look at, and that's because these are rare outcomes. So if we want to do more of these kinds of studies—in northern New Jersey, I looked at 80,000 births. I still had small outcomes at the end. So that's how difficult these studies are.

You cannot recommend doing these studies anywhere and everywhere. You have to have good outcome data. You have to have good exposure data. You have to have large numbers of people in order to have a strong enough study to make a dent in the controversies around these chemicals.

Mr. WALDEN. All right. So then are you suggesting that, given the testimony we heard in the first panel and the data on water quality we've seen, that there isn't enough there to do more studies?

Mr. BOVE. No. I'm always looking for an opportunity to do a study. My frustration has always been that the States oftentimes do not have this kind of data available in the drinking water in their municipalities so we could do studies. I would love to repeat the New Jersey studies I did back in the early 1990's. I would love to do that all across the country.

The problem appears to be that there's not enough data on drinking water contamination in this country to be able to do these studies. The other side also is that you need good registries, you need cancer registries, you need birth defect registries. In North Carolina they didn't have a birth defect registry until 1996, and a statewide cancer registry until 1990.

Other States are in somewhat similar state. New Jersey was fortunate. We had both in place early enough and good drinking water data so I could do these studies.

Mr. WALDEN. Weren't there medical records on the base that you would be able to search back through, or the individual service members' records.

Mr. BOVE. We were able to use the medical records to verify the cases in the current study, although we have some cases where there are no medical records available. Medical records do not stay at the Naval Hospital. They get shipped to another location for storage. I'm not sure exactly when I can get back to you on that. But they are stored. They're not destroyed.

Mr. WALDEN. So they do exist?

Mr. BOVE. But they're not easy to access and they are not filed in any way that would be very easy to link the population with the outcome.

Mr. WALDEN. My time has expired. Thank you, Mr. Chairman.

Mr. STUPAK. We're going to go another round. I will let you go over because I know you gave some time to Mr. Burgess.

After you do your study, and Ms. Leonard, you are going to pay your claims based upon the study; right?

Ms. LEONARD. Yes, sir. When we have the information, we will adjudicate the cases at that time, yes.

Mr. STUPAK. So if their study shows there's a connection between childhood birth defects, you are just going to pay these claims for the childhood defects?

Ms. LEONARD. Well, there's a little more that goes into it besides that. We have to take all of the information and analyze each case on a case-by-case basis, the facts.

Mr. STUPAK. Even if they do their study, you are still going to look at this case by case? You may not do anything with these claims?

Ms. LEONARD. Absolutely. We have to adjudicate each case on its own merits.

Mr. STUPAK. Why are we spending all this money on studies? It seems like we're just delaying here. Delay, delay, delay.

Mr. SINKS. The reason that we do the studies is to add to the science base to inform groups like——

Mr. STUPAK. I understand that. But I want to know about the victims at Camp Lejeune. How are these studies helping them? Because it doesn't look like it's helped them at all.

I will take that back. You did point out today that through your investigation based on this report, you did today on page ES–10 from 19 January 1955—I will take it back—first exceeded the minimum content level was October 1957. So the pollution at Tarawa Terrace has been going on since 1957. Your study has only gone on from 1968 forward. Can you go back to 1957 and take a look at this? If you take a look at it from 1957 on, according to your chart, you are way above the minimum content level.

Mr. SINKS. Let me point out that the purpose of our study is not to identify individuals who were affected for compensation. That is not the purpose of our study. The purpose of our study is to do the most credible work we can do from a scientific point of view.

Mr. STUPAK. On TCE and PCEs, right?

Mr. SINKS. TCE and PCE contamination at Camp Lejeune. We made a decision to start in 1968, not because that's when pollution started, but because that's when we could identify the cohort of births that we wanted to look at in order to do our study.

It was really an issue of efficiency.

Mr. STUPAK. So you are saying the information is not available between 1957 and 1968 for the births?

Mr. SINKS. It may be available. We do not have it.

Mr. STUPAK. Wouldn't you want to go back to 1957 now and move forward?

Mr. SINKS. I don't think so. We have more than 12,000 births. We have terrific information, particularly on Tarawa Terrace on the exposure, and we believe that the size of the group we've collected will be sufficient to answer the questions that we've posed. The issue of going back has to do with whether or not our study is sufficient to answer those questions.

Mr. STUPAK. All right.

Mr. SINKS. Now, I will also say that, unfortunately, epidemiology is not the right tool to identify whether an individual has developed a disease from a specific cause.

Mr. STUPAK. I agree. That's where Ms. Leonard can still dispute it, right?

Mr. SINKS. Well, Ms. Leonard will have to decide what she decides. That's not in our court.

Mr. STUPAK. Ms. Leonard, this committee has asked for the litigation report. I understand it's 400-and-some pages. When can we expect that report?

Ms. LEONARD. Sir, I turned that over to the legislative counsel at DoD yesterday, and they will be responding to your request. I'm not the person that would be producing that.

Mr. STUPAK. When?

Ms. LEONARD. I don't have that information. There is a legal review ongoing right now.

Mr. STUPAK. All right. I still get the impression from the first panel——

And General Dickerson, let me ask you this. Why has DoD not notified those residents at Camp Lejeune who were there during the time these wells were in use, that they may have been exposed to TCE or PCE?

General DICKERSON. Sir, there have been numerous communications from the commanding general at the time, from Headquarters Marine Corps, through media surveys, contacted over 3,500 media outlets, whether that be weekly publications, daily publications.

Mr. STUPAK. I realize that. The people who were there, you can't tell me the Marine Corps doesn't know who was at Camp Lejeune from 1965 to 2007.

General DICKERSON. We could probably get the data who was stationed at Camp Lejeune. Would it be 100 percent complete? I'm not sure. We've made every attempt to get the information out and work with ATSDR to make sure——

Mr. STUPAK. Right. I mean military—don't you think you have a responsibility to let these people know they may have been exposed?

General DICKERSON. Yes, sir.

Mr. STUPAK. Why don't you do it?

General DICKERSON. We are doing everything we possibly can to get the media out.

Mr. STUPAK. Not the media.

General DICKERSON. Message.

Mr. STUPAK. Not the media, not the message. I'm talking about notice those individuals who lived there. Why not contact them?

General DICKERSON. Some people, we haven't got an address to get to. Some of the records are not complete on everybody that was stationed there.

Mr. STUPAK. Have you made an effort?

General DICKERSON. We have made every effort to get the word out. That is why the Web site was set up.

Mr. STUPAK. No no, not the word out. Notice directly these people. If you can track down Dr. Gros who is down in Beaumont, Texas, for his son, I would think the military could do it if they wanted to; don't you think?

General DICKERSON. We have a media campaign to go out, based on the study——

Mr. STUPAK. As an officer, wouldn't you expect your Marine Corps would tell you? Were you at Camp Lejeune during this time?

General DICKERSON. The Marine Corps, sir, has tried——

Mr. STUPAK. Were you at Camp Lejeune during this time?

General DICKERSON. Yes, sir, I was. I was stationed there from 1974 to 1978, from 1983 to 1986.

Mr. STUPAK. Would you expect to be notified?

General DICKERSON. I was. Yes, sir.

Mr. STUPAK. How would you notified?

General DICKERSON. By letter, by communications, and base papers.

Mr. STUPAK. Don't you think everybody, then, should get a letter?

General DICKERSON. Yes, sir. To my knowledge, everybody who was in affected areas had a letter.

Mr. STUPAK. That's not what the first panel said.

General DICKERSON. I understand what the first panel said. Yes, sir.

Mr. STUPAK. Dr. Sinks, have you been told by DoD why they didn't fund your study from 1998 to 2000? Have you been told?

Mr. SINKS. No, I have not. I was not with ATSDR at that time.

Mr. STUPAK. Do you have any reason? Have you drawn any conclusions why they did not fund you?

Mr. SINKS. I can't draw any conclusions about that. I can tell you that we did not stop our work and that we went ahead and funded it with our CERCLA dollars to ramp up to begin the study.

Mr. STUPAK. OK. Has the Marine Corps promptly and fully disclosed to you all information pertaining to the contamination so that accurate studies of adverse health effects could be conducted?

Mr. SINKS. Since I have been involved in this, which is about the past 3 years, every time I have made a request they have made the information available, and most of this information Mr. Maslia has been involved with, and I believe he's gotten very good cooperation. Morris, do you want to add anything?

Mr. MASLIA. Yes, sir. We have received the information that we have requested. Some of the issues involved is identifying who may have the information, and in our vernacular or our jargon, from a modeling standpoint, an epidemiologist identifying it so the people on base understand exactly the type of information we're looking for.

Mr. STUPAK. OK.

Dr. Sinks, of these 57 children with confirmed illnesses or children of interest, as you call them, how many of these 57 are still alive?

Mr. SINKS. I'm going to defer that to Dr. Bove. He may know that. I don't have the information.

Mr. BOVE. I don't have the information in front of me. I will have to get back to you.

Let me say one thing though; that the neural tube defects, including in particular anencephaly, they die pretty much right after birth, so those would definitely be dead. Some of the spina bifida cases would be dead because the leukemias would be dead. So I would—but I will get back to you.

Mr. STUPAK. It doesn't sound like very many would be alive, then.

Mr. BOVE. The majority are still alive, as of the survey which is the last time we checked on their vital status. The majority are alive, but I don't have the exact number, and I'll get back to you with it. But whether they're alive or dead, they were in our study, and they stay in our study.

Mr. STUPAK. OK.

Dr. Sinks, do you want to say something?

Mr. SINKS. I was just going to add that most of the clefts, cleft palate, cleft lip, would not be fatal. We've had a tremendous success in treating childhood cancers over the past 15–20 years, so I would think that a significant number of the kids with leukemia would have survived. And the neural tube defects, most of the spina bifidas, probably would still be alive.

Mr. STUPAK. If the Marine Corps provided you all the names of all the people who are living in Tarawa Terrace from; 1957 until 1997, would that help you?

Mr. SINKS. In terms of this childhood study or additional studies?

Mr. STUPAK. The information you need.

Mr. SINKS. Well, we have the information we need.

Mr. STUPAK. I get the feeling you would study this thing to death if we let you. I am trying to bring this to some kind of end here.

Mr. SINKS. We would be pleased with the opportunity to use our skills in environmental measurements in epidemiology to do more work. There's no question about it.

Mr. STUPAK. My time's just about up. You keep talking about water modeling, OK. That's TCE, PCEs, in the water, how much at certain times; like that, right?

Mr. SINKS. It's more detailed than that. We have just a few data points that were collected between 1982 and 1985.

Mr. STUPAK. But there's no doubt in this area we're talking about Tarawa Terrace, Hadnot Point, people were exposed to TCE and PCE.

Mr. SINKS. Well, certainly our water modeling——

Mr. STUPAK. You don't know if it's one glass of water that would trigger childhood leukemia or if it's 3 years of drinking the water, do you?

Mr. SINKS. I wouldn't know how much it is.

Mr. STUPAK. Right. So why is water modeling so important when you have statistics like you show here, off the charts?

Mr. SINKS. Because we don't rely simply on saying there's an association because somebody drank one glass and someone drank no glasses.

Mr. STUPAK. That's right. And you don't ask them how many glasses they drank. From a scientific point, they're exposed or they're not exposed.

Mr. SINKS. No, that's not the point. The point is the risk increases with the amount somebody took. We do look for a dose response. It's very important for looking at causal relationships, and without it——

Mr. STUPAK. So what's the minimum you look for for exposure here at Camp Lejeune?

Mr. SINKS. What do you mean by "minimum?"

Mr. STUPAK. What's minimum exposure?

Mr. SINKS. Minimum concentration?

Mr. STUPAK. No. What's the exposure? How many days do I have to be exposed before I would be included in your study? The question is, is are we categorizing people in an exposed category for having been in this area 1 day, 30 days, 60 days?

Mr. BOVE. We do everything on the month, not by the day.

Mr. STUPAK. How many months do I have to be exposed?

Mr. BOVE. For neural tube defects and for oral clefts, the timing of the dose would be first trimester. After the first trimester, no matter what you are exposed to, will not cause those outcomes. OK? They are caused early in the pregnancies. It's part of the difficulty of studying them. For the neural tube, it's day 20 of gestation to day 27.

Mr. STUPAK. So a 3-month period.

Mr. BOVE. Well, in that case, the third to fourth week of pregnancy, when the person doesn't even know they're pregnant oftentimes, is when the dose would cause that neural tube defect. OK. So it depends on the outcome. For childhood leukemia from the Woburn study, we get the idea that the exposures during pregnancy are more important—the exposures during gestation are more important than the exposures after birth, although there's still some controversy about that in the literature.

Mr. STUPAK. How long did it take you to do the Woburn study?

Mr. BOVE. There were two Woburn studies.

Mr. STUPAK. How long did it take to do two of them? Because we're on 10 years here.

Mr. BOVE. The first Woburn study started in 1982 and finished in 1987.

Mr. STUPAK. Five years.

Mr. BOVE. The second one started in the early 1990's and didn't finish until the late 1990's. The difference between Woburn and the Camp Lejeune study, there are several. First, they did not do groundwater transport. They just used the one sample they had, 267 parts per billion, and modeled the drinking water system.

We're doing much more than that in terms of modeling. In order to determine when the contamination started, we don't know that without the modeling. The 1957 day you keep mentioning, we would have no idea without the modeling. We would have no idea what the levels were before 1980 because there are no data before 1980. In fact, we wouldn't know the levels pretty much until 1982 when we start getting some specific numbers for the particular VOCs.

But we know that the exposures happened before that. The only way to know that is through modeling. There's no other way to do it. It takes a long time to do this kind of modeling. This is cutting-edge technology here we're talking about. There's no other study that's done this. I just want to get that across.

Mr. STUPAK. It would be a lot more—I won't even go there. Any other questions from this side?

Mr. WHITFIELD. Just one more.

General Dickerson, I would like to ask you a question. TCE was first detected in drinking water at the Wurtsmith Air Base up in Michigan in October 1977. And the Air Force officials immediately took steps to identify those wells, and within 1 month they basically closed those wells down. Now, you were not the commanding general certainly at Wurtsmith which is an Air Force Base, and you were not commanding general at Lejeune. But in Lejeune, the first notice was in 1980 and then in 1982, and they didn't close these wells down until 1985. So a period of 3 to 5 years at Lejeune for them to make that decision. From your personal knowledge or your discussion with other people involved, what was the difference in the speed of closing down Wurtsmith and Lejeune? Why was there that kind of discrepancy?

General DICKERSON. Sir, I can't speak for the Air Force on what they did. But I can say everybody at Camp Lejeune reached out to the State environmental, to the EPA, to everybody, to find out what was the causes of the VOCs in the water at the time, to find out what the impact was. They did not know. They didn't find out the source of the contamination until 1984 when they found the contaminated wells; and as soon as they found they were contaminated, they shut them down.

There were no standards. That's part of the complicating factor here on what to expect. There were snarls that had been put out, but there was never any consistent data when they did sample the water. Now, I'm talking finished water to come up with the conclusion of what the impact was going to be on the consumption, once it was discovered that the wells were contaminated they shut the wells down.

Mr. STUPAK. Can I jump in?

Mr. WHITFIELD. Sure.

Mr. STUPAK. The big black binder there, go to exhibit No. 20, General. Because, man, when I read it as early as 1972, the Navy regulations regulated your water, what contaminants could be in. What could that be in, 1972? So all this stuff about standards in the 1980's doesn't make sense.

When you look at exhibit No. 20, it says Navy regulations required regular drinking water testing, and although TCE and PCE are not specifically mentioned, these regulations set limits for chlorinated hydrocarbons at 3 parts per billion. That's lower than the 5 parts per billion EPA has right now. That's 1972.

So in answer to Mr. Whitfield's question, I don't think that would be quite right, according to the exhibit from the Navy.

General DICKERSON. Sir, I am not familiar with this BUMEDINST description. But I can say the water was tested. All finished products were tested.

Mr. STUPAK. Based upon 1972 standards, right, sir?

General DICKERSON. I can't say that.

Mr. STUPAK. Read it. It says right there, 1972.

General DICKERSON. I see this. Yes sir.

Mr. STUPAK. So it's 1972, right? You see that?

General DICKERSON. I would hope it was by this instruction.

Mr. STUPAK. OK. So there was a standard as early as 1972. So your answer to Mr. Whitfield would not be responsive or accurate.

General DICKERSON. It was tested, but I cannot say specifically if these standards were employed at that time.

Mr. STUPAK. Well, Marine Corps was required to follow Navy regulations, were they not?

General DICKERSON. Marine Corps does follow Navy regulations.

Mr. STUPAK. Is it a violation of your military code if you ignore the regulations?

General DICKERSON. No, sir. We do not ignore any regulations. We hold ourselves to the highest standard.

Mr. STUPAK. So then, 1972 for hydrocarbons, 3 parts per billion.

General DICKERSON. If that's what this instruction says, yes, sir.

Mr. STUPAK. Exactly what it says. So you had a standard in the 1980's. Someone chose to ignore it.

Ms. DREYER. Sir, if I can add a little to this. Also suggested no adverse response level values which ranged from 2,000, 2,300 down to——

Mr. STUPAK. That's not what the document says. Navy regulations says 3 parts per billion. You are required to follow Navy regulations if you are in the military, and Camp Lejeune would be one of those installations under Navy control. Therefore you would expect they would follow 3 parts per billion, would you not?

Ms. DREYER. I'm not familiar with that document either, but you would expect it. Let me also say that the source of the chemicals, the TCE and PCE was in the well water. When Camp Lejeune figured out that the well water was the source of these chemicals, the day they sampled that well, they shut the well down. Yes, it did take a long time between 1982 and 1984 when they actually sampled the well. This is during the time when there were concerns about asbestos-coated piping as well. And they did do some research to try to determine what was the cause of these chemicals. Ultimately it was determined to be the wells.

So it didn't take a month, once the well was sampled and the chemicals were identified. It was more in terms of days.

Mr. STUPAK. Are you telling me the military's response is—even though we know we are extremely higher than 3 parts per billion, way over our Navy regulations, we would continue to expose people because we can't find the source? That's ludicrous. If you are concerned about the health and safety of the people you are dealing with, if they're being exposed to it, you would bring in potable water, you would take other action. Your CID, Criminal Investigation Division, basically the investigation found that they were not forthcoming in questions, were not diligent in providing expertise, coached in their answers, steered away from admitting knowledge of organic interference from solvents.

It's been there since 1972. Your people were exposed to it, and you didn't do anything.

General DICKERSON. I wouldn't say that the Marine Corps, that Camp Lejeune didn't do anything at that time. I will say that they did work closely with the State of North Carolina environmental to detect and find out what was contaminating the water, see what the level of contaminants were and what the impact was. They didn't know. There were no standards for these contaminants at that point in time. I understand the view of what you have pointed out to us today.

Mr. STUPAK. I yield back. Sorry.

Mr. WHITFIELD. Ms. Dreyer, you are responsible today for the environmental restoration program for the Marine Corps; is that correct?

Ms. DREYER. Yes, sir.

Mr. STUPAK. So all of the bases around the U.S.?

Ms. DREYER. Yes, sir.

Mr. STUPAK. And are there other bases that are being operated today that have water problems, water quality problems?

Ms. DREYER. We have other bases across the Marine Corps that have these chemicals in the soil and groundwater. But I'm not aware that any of these chemicals have entered into the drinking water system or have impacted drinking water, no.

Mr. WHITFIELD. OK. I yield back the balance of my time.

Mr. STUPAK. Mr. Walden, any questions?

Mr. WALDEN. I just want to go back to this document, see if I understand what you are saying here. This is the one on tab 20 that deals—25 August, 1972, the BUMEDINST 6240.3C, where it limits the chlorinated hydrocarbons. First, I am not a chemist. Did these two chemicals that we are referencing today fall under this category of chlorinated hydrocarbons?

General DICKERSON. I would defer that to——

Ms. DREYER. I believe they did, yes.

Mr. WALDEN. That is a yes then?

General DICKERSON. Yes, sir.

Mr. WALDEN. OK. So then the level that is referenced here on page six of that document, the 0.003 to 0.1 concentrations in milligrams per million, that would have been way below what you were reading coming out of the tap; right?

General DICKERSON. Yes, sir.

Ms. DREYER. Yes, that is correct. Generally, at that time period, the method detection limit or the laboratory's capability of detecting chemicals in water was generally about 10. If Camp Lejeune officials during that time got a reading of 10, it could be reported as nondetect or otherwise not present in the sample. That is correct.

Mr. WALDEN. And at that time, what were their readings?

Ms. DREYER. They varied. That was part of the problem. In many instances they would have nondetect. We have seen as high as

1,400 in tap water. I will point out that 18,000 figure is from a well sample. And that well would not have been provided directly to anybody to drink. It would have been transported to the water treatment plant and mixed with other wells that were pumping at that time. So the highest reading that I am aware of right now at the Hadnot Point system is 1,400 parts per million, which is well above today's standard.

Mr. WALDEN. Was it above this standard from the 1972 document?

Ms. DREYER. It would be, because this is three, and that would be five, and the only question I would have—and I am not a laboratory analyst, so I don't know what the method detection limit was. It could have been 5; it could have been 10. It varied depending upon the laboratory and their credentials.

Mr. WALDEN. And who was in charge then at Camp Lejeune to make sure that these levels were being followed?

General DICKERSON. All of the officials, sir. All of the officials at Camp Lejeune would have been in charge, just like they are today, monitoring this, trying to detect what the levels of the particles are per——

Mr. WALDEN. And General, have you gone back and looked to see if anybody who was in charge over the last 20 years did anything when a detection level exceeded the one listed here occurred? Is there any documentation that would indicate somebody said, wait a minute, we are over the limit?

General DICKERSON. I can say that there has been an EPA Criminal Investigative Division investigation, there has been a GAO investigation, and six separate studies, to include the Commandant's panel looking into the past to find if there was any wrongdoing. And everybody has come back and said there were no criminal intentions. Everybody did the best with the information they had at the time. Unfortunately, some of the levels on a day-to-day basis were above the acceptable levels for drinking water.

Ms. DREYER. If I can add to that, the base chemist at Camp Lejeune during the early 1980's did make handwritten notes on some analytical data suggesting that it was highly contaminated, and that is in the record. I will also note that the Navy, the chairman mentioned a quote about LANTDIV. LANTDIV is the Atlantic Field Division of the Navy Facilities Engineering Command. And during the early 1980's, I don't know when it transitioned to Camp Lejeune, but during the early 1980's and possibly before that, the Navy was supporting the Marine Corps with some engineering services, including this water sampling. And that is part of trying to reconstruct the history and figure out, when did Camp Lejeune know? It is unclear to us even today. But we do have the information that, in the 1980's, we had interferences, and we do have analytical data in 1982.

Mr. WALDEN. So then I just want to make sure I understand what you are saying, what did you say, the LAN——

Ms. DREYER. The Navy, one of the field divisions of the Navy.

Mr. WALDEN. So they were maybe responsible for ensuring that these regulations were followed, water was——

Ms. DREYER. They were conducting the water sampling and analysis. And at that time, they were trying to comply with the future regulation of the disinfection byproduct process, TTHMs. And that is when this all came about, when they were gearing up to find out if those chemicals were in the water. And they were masked by these other chemicals when those came to light.

Mr. WALDEN. I see. I guess what I am struggling with, and I imagine some of my colleagues are, is, if you were seeing this pollutant in the tap water, wouldn't it have made sense in less time than 4 years to go to the sources and see where it was coming from?

Ms. DREYER. Yes, it does.

Mr. WALDEN. We are looking back, so we have got 20/20 vision.

Ms. DREYER. That is correct. And through my research, through everyone's research, including the first panel, the second, all three panels, we have all been trying to figure out what happened. We are looking back 20 years, trying to put it into context, trying to figure out, could we have done things better? Should we do things better? But trying to reconstruct that is very, very difficult.

Mr. WALDEN. Right. I am not trying to pit one branch against the other. My understanding is the Air Force took that action in a matter of what, a month's time or something when they discovered at Wurtsmith that the tap water was bad. They went right to the wells.

Ms. DREYER. Right.

Mr. WALDEN. So why wouldn't that have occurred?

Ms. DREYER. I am not familiar with their water distribution systems. I really think it would be more appropriate if they were in the room to answer. But we could have different systems. I am not sure.

Mr. WALDEN. General, did you have something?

General DICKERSON. Sir, I would just add, if this was to occur today and there were no levels that had been determined by the EPA, the water would be shut down until they could find the ingredient that is being introduced into the water. We have learned a lot from what happened back in the early 1980's.

Mr. WALDEN. Yes.

General DICKERSON. We had to rely upon the science, the data that is coming out of ATSDR to find out what was the impact.

Mr. WALDEN. And I hope you understand where we are coming from. We want to make sure it never happens again first. And that is our job on the oversight committee all the time is to figure out, what went wrong; why did it go wrong; and how do we prevent it from going wrong again on all these topics we take up. But second is, I think you hear the passion in our voices about taking care of those especially who have worn our Nation's uniform, who have been injured by this. And I realize you are doing the studies and all that, but these people are sick and dying along the way and fighting for benefits and help for illnesses that it looks to me like there is a pretty good relationship here. But I am not a scientist. But we need to take care of those people.

General DICKERSON. Our most precious resources are our Marines and families, and we are going to do everything possible to take care of them.

Mr. WALDEN. I am sorry to interrupt you. I am going to run out of time here. I want to go to one other point you said, because you talked about, you got a letter notifying you of potential health risks from Camp Lejeune.

General DICKERSON. Yes, sir.

Mr. WALDEN. Do you know how many of those letters went out?

General DICKERSON. It was my information and knowledge that everybody living on the base got one of those official letters. Now whether they were received or not I cannot testify to this committee.

Mr. WALDEN. I understand, but this is everybody living on the base at the time you were living on the base?

General DICKERSON. Yes, sir.

Mr. WALDEN. Not that they tracked down those who had lived on the base.

General DICKERSON. No, sir, at that point in time, from the commanding general, it was those who were living on the base.

Mr. WALDEN. At that time?

General DICKERSON. Yes, sir.

Mr. WALDEN. This would explain why some people in the room say I didn't get a letter, because they may have not been living on the base at that time. Is that correct?

General DICKERSON. To my knowledge, that is correct, yes, sir.

Mr. WALDEN. So I think the other piece we are after here is, what would it take to reach out to anybody who had lived on the base? I am assuming somewhere in their military files that OSD has, or somebody, there is a chronology of where everybody was at any time, or Camp Lejeune probably has records that would indicate who lived there and who didn't. Is that correct?

Ms. DREYER. There is a lot of information out there about that. I will say that, upon conclusion of the ATSDR study, the Marine Corps is going to conduct full notification in conjunction with ATSDR to get the result, not only the potential exposure but the effects of that. What does it mean?

Mr. WALDEN. Sure.

Ms. DREYER. Right now, the Marine Corps, ATSDR has just completed their water modeling, so they have their estimations of how much people may have been exposed to. They mentioned also that they have not yet completed the Hadnot Point water modeling system. So those people still don't have answers to these important questions. The third thing that they don't have yet is, what does this mean? And I think you are getting at that here. We know that people were exposed. We know there were chemicals in the water. What does that mean? A lot of people want to know that same question. I know ATSDR does. That is why we need to have the study completed. But one other thing, it is not as easy to contact people individually, especially prior to the early 1970's, when people did not have Social Security numbers, and they had service ID numbers in the military. So that would be a very difficult and laborious task. We could try. But I could never commit to finding 100 percent of people who may have been exposed that. It would be very difficult. The best way to reach them is probably through mass media and every alternative possible, being as broad as possible.

Mr. WALDEN. We just don't want to leave anybody behind.

Ms. DREYER. I agree, sir.

Mr. WHITFIELD. Mr. Chairman, I would just like to make a comment. All of us have the highest respect and admiration for our men and women serving in the military, and those who have served, but I think the bottom line of this incident at Camp Lejeune can be summarized in just a few comments from the EPA Criminal Investigation Division of the Naval Facilities Engineering Command Atlantic Division on this incident. And they said, in a number of different places, this investigation found the staff of the LANTDIV was not forthcoming when questioned about these issues. This investigation found that LANTDIV as a technical advisory organization to Camp Lejeune was not diligent in providing the technical expertise on this issue. LANTDIV personnel consistently steered away from admitting any knowledge of organic interference from solvents. The biggest area of concern were the seemingly rehearsed statements provided by the personnel of LANTDIV. The greatest concern lay in the fact that investigators found LANTDIV personnel to have been coached. Something I think there may not have been any criminal charges, but I think it is a sad day that the investigation shows quite clearly that people were not forthcoming. And like I said, we are very proud of our military, but I think, in this incident, the military leadership failed the men and women who serve this country and their families.

General DICKERSON. Sir, if I could comment on that, it would be beneficial if you could get representatives from LANTDIV to answer that question directly.

Mr. STUPAK. We plan on having them in. I just don't do one hearing and stop it. This thing is going to go on. LANTDIV is the Naval Facilities Engineering Command Atlantic Division. So the military certainly knew about it. And as Mr. Whitfield didn't say, he didn't go on and talk about even far more, that it wasn't until 1984 that the Natural Resources Environment Affairs Division at Camp Lejeune personnel ever sampled individual wells, as opposed to finished drinking water at the water treatment plants. Self-admittedly, this was the most significant lapse in judgment. Not only didn't do it until 1984, but you actually had your Naval regulations in 1972, so for 12 years they did nothing because your Naval regulations under tab number 20 is very clear, the presence of the following substances in excess of the concentrations listed shall constitute grounds for rejection of supply—rejection of the water supply; 3 parts per billion. You were way over that. Way over that. Your own rules said you should have rejected it. And you didn't do anything. So that is why we are here.

This, also, lack of notice; you can't notify people. When you take a look at the report, whether it is GAO, they tell you how many people were on base, how many people came on base. I can't believe the military cannot provide that information to either, whether it is Dr. Sinks' group or whatever, or they could get a letter, like you indicated. My chief of staff here sits here and says, man, I moved three times in the last few years, but still I get a recall notice on a car that I owned three moves ago. And if a private company can still notify you about your clunker, which is probably already no longer on the road, but can give you recall notices, I would think the military could contact people who were exposed. And I would go from 1957 until 1987, that 30-year period. I just can't believe you can't do that. That's inconceivable to me.

Any further questions? We will dismiss this panel. Thank you.

Dr. Sinks, you had something you wanted to add?

Mr. SINKS. Yes, just to remind you that we are involved in the feasibility study. The feasibility study is looking at adults. It would look at cancer incidence and total mortality. We are working with the Department of Defense to identify records of individuals who were at Camp Lejeune during that time period. And we have had a good amount of cooperation from them to determine if we can get access to those records and construct the cohort of individuals you are suggesting.

Mr. STUPAK. I am sure if you are wanting all these studies done, I am sure if you just reach out to those people who were exposed to TCEs and PCEs from 1957 to 1987 in Camp Lejeune, sent them a letter and put it in their hot little hand, so there is no dispute whether or not they got notice, I am sure they would give you a waiver so you could get all the medical records you wanted. But until they get that letter, they have got to rely on media. And even though we have a little coverage of this hearing today, 99 percent of them will never hear about this hearing we had today. That's why it is so important to have direct contact with those individuals. And those people who were off base but worked on base, they certainly drank that water, too. Thank you.

Mr. STUPAK. All right. Our next panel, a third panel, as this panel vacates, I will ask the following witnesses to come forward for our third panel: Dr. Peter Murtha, Director of EPA's Office of Criminal Enforcement; Mr. Tyler Amon, Special Agent for EPA's Criminal Investigation Division; Mr. Frank Hill, Director of Superfund Division at EPA's Region 4 Office; and Dr. Marcia Crosse, Director of Public Health and Military Health Care issues in the Government Accountability Office, GAO.

Mr. Amon, are you going to testify? OK. We got everybody at the table.

As you know, it is the policy of this committee to take testimony under oath. Please be advised that, under the rules of the House, you have the right to be advised by counsel during your testimony.

Any of you wish to be advised by counsel during your testimony? There are no indications. I think everyone does not wish to be represented by counsel. I am going to ask you to rise and raise your right-hand, please.

[Witnesses sworn.]

Mr. STUPAK. I would like the record to reflect all witnesses answered in the affirmative. We will now begin with our 5-minute opening statements from our witnesses. We will start on the right-hand side.

Mr. Murtha.

STATEMENT OF PETER J. MURTHA, DIRECTOR, OFFICE OF CRIMINAL ENFORCEMENT, FORENSICS AND TRAINING, OFFICE OF ENFORCEMENT AND COMPLIANCE ASSURANCE, U.S. ENVIRONMENTAL PROTECTION AGENCY

Mr. MURTHA. Thank you, Mr. Chairman and members of the subcommittee, I am Peter J. Murtha, and have been Director of the

Office of Criminal Enforcement, Forensics and Training, at U.S. EPA since November 2003. Previously, I spent over 16 years as a Federal prosecutor. Thank you for inviting me to appear today to discuss the agency's criminal investigation relating to contaminated drinking water at Camp Lejeune and the decision not to proceed with Federal criminal charges. Mr. Chairman and members of the subcommittee, EPA respects your oversight interests.

I would like to acknowledge that Special Agent Amon is present here today at the committee's request. However, I would like to note for the record that EPA has objected to the subcommittee seeking the testimony of a field agent such as Special Agent Amon. We have outlined our reasons and offer of accommodation in a letter that we sent to the subcommittee. Nonetheless, given the unique and compelling circumstances surrounding this hearing, Special Agent Amon is available to testify if the subcommittee finds that necessary.

In bringing this investigation, we were acutely aware of the anguish and deeply held feelings of the former military and civilian residents of Camp Lejeune who brought the allegations. And I can say that we were especially careful to conduct this investigation as comprehensively as possible. The criminal investigation was opened in October 2003. The investigation was conducted by a senior criminal investigator out of the CID's division in Charlotte, North Carolina. I have conferred extensively with that investigator for my testimony here today. The investigation was also closely monitored by CID headquarters in Washington. Close and ongoing consultation was maintained with both DoJ's Environmental Crimes Section and the U.S. Attorney's Office in Raleigh, North Carolina. Investigators examined events surrounding the generation of the 1980 through 1982 water sampling results provided by the U.S. Army Environmental Hygiene Agency and by the Grainger Laboratory. The latter report definitively identified the presence of TCE and PCE in Camp Lejeune's drinking water in 1982.

The initial reaction to and decisions made by the military after having received these two sets of data was important background information for the investigation. CID investigators interviewed 26 individuals, including personnel from Camp Lejeune and the Navy Facilities Engineering Command Atlantic Division, or LANTDIV, which had oversight responsibility for environmental conditions at the base during this period; consulted extensively with an expert in public health and drinking water regulation; and reviewed thousands of pages of relevant documents during the course of this investigation. After about 18 months of investigation, and a thorough review of all the pertinent evidence, the agency and DoJ mutually agreed that criminal charges should not be sought in this matter. That decision was primarily based on the following findings.

First, the Safe Drinking Water Act provided no enforceable limits on TCE and PCE at the time that military officials became aware of the presence of these chemicals in the water supply at the base. EPA did not pass enforceable regulations relating to these chemicals until 1989 and 1991, respectively.

I should also mention, parenthetically, even if those standards had been in place, the Safe Drinking Water Act does not provide criminal penalties for knowingly providing drinking water which violates standards. Rather, the act only provides criminal penalties for introducing contaminants with specific intent to harm.

Second, the statute of limitations for all substantive Federal crimes is 5 years. Thus, even had there been criminal conduct committed in the 1980's, it would not have been prosecutable in 2005 unless it formed a part of a criminal conspiracy that continued to a point within the limitations period. The investigation found no such ongoing conspiracy by any persons with a role providing drinking water at Camp Lejeune. The investigation concluded that there was no conspiracy to conceal records and prevent persons from talking with ATSDR regarding the congressionally mandated health study or to conceal FOIA records from the public. The investigation further determined that the Marine Corps did not make false statements to Federal investigators and that there was no basis on which to prosecute LANTDIV personnel for false statements or obstruction of the investigation.

Finally, with regard to the allegations regarding the ATSDR, the investigation did not substantiate allegations of a conspiracy to improperly administer its health study or destroy ATSDR records.

In summary, DoJ and EPA concluded that when all the available evidence was considered under the environmental requirements applicable at the time of the relevant activities in this case, the evidence did not support the bringing of Federal criminal charges. Harm occurred at Camp Lejeune and individuals suffered. However, after a thorough investigation, it was determined that the criminal enforcement process was not a viable means of addressing those wrongs. Thank you for the opportunity to testify here today, and I would be glad to answer any questions from the subcommittee.

[The prepared statement of Mr. Murtha follows:]

TESTIMONY OF
PETER J. MURTHA, DIRECTOR
OFFICE OF CRIMINAL ENFORCEMENT, FORENSICS AND TRAINING
OFFICE OF ENFORCEMENT AND COMPLIANCE ASSURANCE
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS
COMMITTEE ON ENERGY AND COMMERCE
UNITED STATES HOUSE OF REPRESENTATIVES

June 12, 2007

Mr. Chairman and Members of the Subcommittee, my name is Peter J. Murtha. I am the Director of the Office of Criminal Enforcement, Forensics and Training (OCEFT) in the Office of Enforcement and Compliance Assurance at the Environmental Protection Agency (EPA). Prior to re-joining the Agency in January 2002, I spent over 16 years as a federal prosecutor. Since November of 2003, in my capacity as the Director of OCEFT, I have directed EPA's investigation of environmental crimes. Thank you for inviting me to appear today to discuss the Agency's criminal investigation relating to contaminated drinking water at Camp Lejeune and the decision not to proceed with federal criminal charges.

This was a complex investigation, requiring a review and assessment of activities and actions that, in some cases, occurred decades ago. We were acutely aware of the anguish and deeply held feelings of the former military and civilian residents of Camp Lejeune who brought the allegations to the attention of EPA and the department of Justice. While EPA's criminal enforcement program always strives to conduct its investigations with great thoroughness and professionalism, I can say that given the seriousness of the allegations and the underlying environmental and human health harm, we were especially careful to conduct this investigation as comprehensively as possible. The issue for the criminal enforcement program was not whether pollution and exposure to contaminated drinking water occurred -- this is incontrovertible – but whether there was sufficient evidence to indicate that prosecutable organizations or individuals criminally violated the law.

My testimony today will describe in general how EPA's criminal enforcement program conducts a criminal investigation and what we did in the Camp Lejeune drinking water investigation.

EPA's Criminal Enforcement Program

EPA's criminal enforcement program investigates violations of environmental laws that both pose a significant threat to human health and the environment, and manifest the required criminal intent. In addition to the federal environmental statutes, the program also enforces U.S. Criminal Code (Title 18) violations often associated with environmental crimes, such as conspiracy, false statements, interfering with a federal investigation, and so forth. OCEFT administers this program through its Criminal Investigation Division (CID).

Our CID offices are located in 10 Area Offices and 36 Resident Offices throughout the country. The program and offices are centrally managed out of Headquarters. Our special agents are fully authorized law enforcement officers.

EPA participates nationwide in dozens of environmental crime task forces. Our partners in these task forces consist of other federal law enforcement agencies, Offices of the U.S. Attorney, as well as state and local law enforcement and regulatory agencies. During the Camp Lejeune drinking water investigation, EPA's criminal enforcement program worked closely with prosecutors from the Environmental Crimes Section (ECS) of the Department of Justice (DOJ) in Washington and the Office of the US Attorney, Eastern District of North Carolina, which is the federal judicial district within which Camp Lejeune.

Opening a Criminal Investigation

The decision to commence a criminal investigation is not undertaken lightly. The Criminal Investigation Division uses case selection criteria to determine whether a lead (information suggesting criminal activity) should become a formal criminal investigation. The two major criteria are *significant environmental harm* and *culpable conduct.*

Significant harm is measured by the presence of actual harm or the threat of significant harm to human health or the environment. Culpability is measured by the existence of deliberate conduct, repeated violations, concealment, tampering, or operations entirely outside EPA's regulatory system.

One of the most-commonly asked questions regarding EPA's criminal enforcement program is: What makes an environmental violation criminal? As a legal matter, environmental criminal liability is triggered only through the existence of some level of intent, or "*mens rea.*" For example, if "lying, cheating, or stealing" is involved, the violations are likely criminal.

To evaluate the extent of criminal conduct, EPA considers factors in the criminal case selection process such as: a history of repeated violations; a wilful disregard for the law (that is, a "specific intent" to violate the law that goes beyond the "general intent" that the government must prove to obtain a felony conviction under most environmental statutes); concealment or falsification of information, or tampering with monitoring equipment; and attempts to "fly under the radar" of the regulatory system altogether. The presence of one or more of these factors make a criminal investigation more likely.

The Camp Lejeune Criminal Investigation

In the 1980s, the drinking water for Camp Lejeune was drawn from groundwater wells that fed eight treatment plants which supplied finished drinking water for the base. From an unknown start date, but likely approximately 1957 through 1985, numerous wells servicing two of the treatment plants were contaminated with trichloroethylene (TCE) and tetrachloroethylene (PCE). The contaminated wells were shut down between December 1984 and February 1985.

In 1989, Camp Lejeune was placed on the National Priorities List (NPL) for clean-up under the Comprehensive Environmental Response, Compensation and Liability Act CERCLA). In the early 1990s, the Agency for Toxic Substances and Disease Registry (ATSDR) began assessing the human health effects of exposure to contaminates on Camp Lejeune.

In August of 2003, retired Marines and former residents of Camp Lejeune contacted the Environmental Crimes Section of the Department of Justice, and later the U.S. Attorney's Office for the Eastern District of North Carolina, about the water contamination issues at the camp. Many of these Marines believed their family members had died or suffered other serious health effects as a result of exposure to contaminated drinking water.

These individuals alleged that military and civilian employees of the USMC and Navy conspired to violate the Safe Drinking Water Act (SDWA), and had conspired to conceal records and provide false statements to officials of the Agency for Toxic Substances and Disease Registry, who were conducting a congressionally mandated public health study. An additional series of allegations pertained to how ATSDR officials maintained health study records and interacted with the military.

The allegations clearly met the EPA case selection criteria. The threat of significant harm stemmed from the drinking water contamination and the need to effectively respond to the resulting public health issues at Camp Lejeune. The illegal conduct alleged by the private citizens concerned the concealment of records connected with the contaminated drinking water on the base by the USMC from the public and the ATSDR via its requests for data. The case also initially carried allegations of government or government contractor misconduct. Consequently, the criminal investigation was opened in October 2003.

The investigation was conducted by CID's Charlotte, NC Resident Office and managed by the Region 4 Area Office in Atlanta, GA. The investigation was also closely monitored by CID headquarters in Washington, D.C. As previously stated, close and ongoing communications and consultation was maintained with both ECS and the U.S. Attorney's Office (USAO) in Raleigh.

An initial period of investigation and review was required to sort through the numerous allegations involving drinking water contamination and conduct that had occurred two decades earlier. Investigators examined events surrounding the generation of 1980-82 water sampling results provided by the U.S. Army Environmental Hygiene Agency (the summary reports that the Subcommittee may have seen refer to these results as the "TTHM Surveillance Report Forms"), and by the Grainger Laboratory. The latter report definitively identified the presence of trichloroethylene (TCE) and tetrachloroethylene (PCE) in Camp Lejeune's drinking water. The initial reaction to, and decisions made by, the military after having received these two sets of data, was important background information for this investigation. Investigators interviewed personnel from Camp Lejeune, and the Naval Facilities Engineering Command Atlantic Division (LANTDIV), which had oversight responsibility for environmental conditions at the base during this period.

The investigation also looked into allegations that the ATSDR destroyed relevant records and conspired to improperly administer a congressionally mandated health study.

Results of the Criminal Investigation

After about 18 months of investigation and a thorough review of all the pertinent evidence, the Department of Justice (i.e., both ECS and the USAO) declined to seek criminal prosecution in the Camp Lejeune water contamination investigation. This decision was agreed to by both DOJ and EPA. That decision was primarily based on the following findings:

- First, the Safe Drinking Water Act provided no enforceable limits on TCE and PCE at the time that military officials became aware of the presence of these chemicals in the water supply at the base. EPA did not pass enforceable regulations related to TCE and PCE until 1987 and 1991, respectively.
- Second, the statute of limitations for all substantive federal crimes is five years. Thus, even had there been criminal conduct committed in the early 1980s, it would not have been prosecutable in 2005 – unless it formed part of a criminal conspiracy that continued to a point within the limitations period. The investigation found no such ongoing conspiracy by any persons (military or civilian) with a role in providing drinking water at Camp Lejeune.
- The investigation concluded that there was no conspiracy to conceal records and prevent persons from talking with ATSDR regarding the congressional mandated health study or to conceal FOIA records from the public.
- The investigation further determined that the Marine Corps did not make material false statements to federal investigators, and that there no basis on which to prosecute LANTDIV personnel for false statements or obstruction.
- With regard to the allegations concerning the ATSDR, the investigation did not substantiate a conspiracy to improperly administer its health study or destroy ATSDR records.

In summary, DOJ and EPA concluded that when the available evidence was viewed under the laws applicable at the time of the relevant activities in this case, and viewed in the context of 1980s environmental practices and the evidence pertaining to the Camp Lejeune employees that addressed the issue, the evidence did not support the bringing of federal criminal charges.

It is clear that harm occurred at Camp Lejeune and individuals suffered. However, after a thorough investigation, it was determined that the criminal enforcement process was not the appropriate avenue to address these wrongs.

I would be glad to answer any questions from the Subcommittee.

Mr. STUPAK. OK. Thank you.

Mr. Amon, you wish to say anything?

Mr. AMON. I have no opening remarks.

Mr. STUPAK. OK. Dr. Crosse?

STATEMENT OF MARCIA G. CROSSE, DIRECTOR, PUBLIC HEALTH AND MILITARY HEALTH CARE ISSUES, U.S. GOVERNMENT ACCOUNTABILITY OFFICE

Ms. CROSSE. Mr. Chairman and members of the subcommittee, I am pleased to be here today as you examine issues relating to drinking water contamination at Camp Lejeune. My remarks today are based on GAO's recent report on efforts to identify and address the past contamination; the provision of funding and information from DoD to ATSDR for its work; and an assessment by an independent panel of experts of the design of the current ATSDR health study.

Efforts to identify and address past drinking water contamination at Camp Lejeune began when the Navy started water testing to prepare for upcoming drinking water regulations. In 1980, volatile organic compounds, VOCs, were first detected during an analysis that combined treated water from all base water systems. During the same year, the Navy began monitoring Camp Lejeune's treated water for total trihalomethanes, TTHMs, contaminants that are a byproduct of the water treatment process. These tests reported interference from unidentified chemicals. In 1982 and 1983, additional testing identified two VOCs, trichloroethylene, TCE, a metal degreaser, and tetrachloroethylene, PCE, a dry cleaning solvent in the Hadnot Point and Tarawa Terrace water systems. Sampling results indicated that the levels of TCE and PCE found in the treated water varied.

Former Camp Lejeune environmental officials told us that they did not take action to address the contamination because, at that time, they had little knowledge about TCE and PCE, and there were no drinking water regulations that gave enforceable limits for these chemicals. In addition, the variation in water testing results raised questions about the validity of the tests. Camp Lejeune officials told us that, in retrospect, it was likely that rotation of wells in these water systems contributed to the variation in results.

Also, in 1982, a Navy environmental program began investigating potentially contaminated sites at many Marine Corps and Navy bases, including Camp Lejeune. Testing initiated under that program in 1984 and 1985 identified individual wells in the Hadnot Point and Tarawa Terrace water systems that were contaminated with TCE, PCE and other VOCs. Ten wells were subsequently removed from service in late 1984 and early 1985.

Since 1991, ATSDR has been examining whether individuals who were exposed to the contaminated drinking water are likely to have adverse health effects. DoD is required to provide funding and data as necessary for ATSDR to carry out certain health-related activities, including Public Health Assessments. In conducting its Camp Lejeune related work, ATSDR has not always received requested DoD funding and has experienced delays in receiving information from DoD. For example, for 3 out of the 16 fiscal years, no funding was provided by any DoD entity to ATSDR for its Camp Lejeune related work because the agencies could not reach agreement about the funding. ATSDR also had difficulties getting documents needed from Camp Lejeune while it was conducting a Public Health Assessment for the base. However, ATSDR officials told us that, while funding and access to records were probably slowed down and made more expensive by DoD, this did not significantly impede ATSDR's efforts. These officials also stated that situations such as limitations in access to data are normal during the course of a study.

ATSDR's current study is examining whether individuals who were exposed in utero are more likely to have developed certain childhood cancers or birth defects. To review the design of this study, we contracted with the National Academy of Sciences to convene an expert panel. Panel members generally agreed that many parameters of the current study are appropriate, including the study population, the exposure time frame and the selected health effects. Some panel experts said that the projected December 2007 completion date appeared to be reasonable, while others said that the date might be optimistic.

Finally, these experts said that the ATSDR study could be strengthened by expanding it to include an additional comparison population of individuals who were not exposed to the contamination but that this would likely extend the time needed to complete the study. They also noted that while the in utero population being studied was the most vulnerable to the contamination, other health conditions, such as adverse neurological or behavioral effects and pregnancy loss, could be related to this exposure.

Mr. Chairman, this concludes my prepared remarks. I would be happy to respond to questions that you or other members of the subcommittee may have.

[The prepared statement of Ms. Crosse follows:]

United States Government Accountability Office

GAO

Testimony
Before the Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives

For Release on Delivery
Expected at 10:00 a.m. EDT
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DEFENSE HEALTH CARE

Issues Related to Past Drinking Water Contamination at Marine Corps Base Camp Lejeune

Statement of Marcia Crosse
Director, Health Care

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Highlights

Highlights of GAO-07-933T, a testimony before the Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, House of Representatives

Why GAO Did This Study

In the early 1980s, volatile organic compounds (VOC) were discovered in some of the water systems serving housing areas on Marine Corps Base Camp Lejeune. Exposure to certain VOCs may cause adverse health effects, including cancer. Since 1991, the Department of Health and Human Services' Agency for Toxic Substances and Disease Registry (ATSDR) has been examining whether individuals who were exposed to the contaminated drinking water are likely to have adverse health effects. ATSDR's current study is examining whether individuals who were exposed in utero are more likely to have developed certain childhood cancers or birth defects.

GAO was asked to testify on its May 11, 2007 report: *Defense Health Care: Activities Related to Past Drinking Water Contamination at Marine Corps Base Camp Lejeune* (GAO-07-276). This testimony summarizes findings from the report about (1) efforts to identify and address the past drinking water contamination, (2) the provision of funding and information from the Department of Defense (DOD) to ATSDR, and (3) an assessment of the design of the current ATSDR study. GAO reviewed documents, interviewed officials and former residents, and contracted with the National Academy of Sciences to convene an expert panel to assess the current ATSDR study.

www.gao.gov/cgi-bin/getrpt?GAO-07-933T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Marcia Crosse at (202) 512-7119 or crossem@gao.gov.

June 12, 2007

DEFENSE HEALTH CARE

Issues Related to Past Drinking Water Contamination at Marine Corps Base Camp Lejeune

What GAO Found

Efforts to identify and address the past drinking water contamination at Camp Lejeune began in the 1980s, when Navy water testing at Camp Lejeune detected VOCs in some base water systems. In 1982 and 1983, continued testing identified two VOCs—trichloroethylene (TCE), a metal degreaser, and tetrachloroethylene (PCE), a dry cleaning solvent—in two water systems that served base housing areas, Hadnot Point and Tarawa Terrace. In 1984 and 1985 a Navy environmental program identified VOCs, such as TCE and PCE, in some of the individual wells serving the Hadnot Point and Tarawa Terrace water systems. Ten wells were subsequently removed from service. DOD and North Carolina officials concluded that on- and off-base sources were likely to have caused the contamination. It has not been determined when contamination at Hadnot Point began. ATSDR has estimated that well contamination at Tarawa Terrace from an off-base dry cleaner began as early as 1957.

Since ATSDR began its Camp Lejeune-related work in 1991, the agency has not always received requested funding and has experienced delays in receiving information from DOD. However, ATSDR officials said that while funding and access to records were probably slowed down and made more expensive by DOD officials' actions, their actions did not significantly impede ATSDR's Camp Lejeune-related health study efforts. The ATSDR officials also stated that while issues such as limitations in access to DOD data had to be addressed, such situations are normal during the course of a study.

Members of the expert panel that the National Academy of Sciences convened for GAO generally agreed that many parameters of ATSDR's current study are appropriate, including the study population, the exposure time frame, and the selected health effects. Regarding the study's proposed completion date of December 2007, the panel experts had mixed opinions: three of the five panel experts who commented said that the projected date appeared reasonable, while two said that the date might be optimistic.

DOD, the Environmental Protection Agency, and the Department of Health and Human Services provided technical comments on a draft of the May 11, 2007 report, which GAO incorporated where appropriate. Three members of an ATSDR community assistance panel for Camp Lejeune provided oral comments on issues such as other VOCs that have been detected at Camp Lejeune, and compensation, health benefits, and additional notification for former residents. GAO focused its review on TCE and PCE because they were identified by ATSDR as the chemicals of primary concern. GAO's report notes that other VOCs were detected. GAO incorporated the panel members' comments where appropriate, but some issues were beyond the scope of the report.

Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today as you examine issues related to past drinking water contamination at Camp Lejeune. In the early 1980s, Department of the Navy water testing at Marine Corps Base Camp Lejeune identified contamination in water systems that served housing areas on the base.[1] Further water testing revealed that some of the individual wells serving two of the water systems were contaminated with volatile organic compounds (VOC), such as trichloroethylene (TCE), which is a metal degreaser and an ingredient in adhesives and paint removers, and tetrachloroethylene (PCE), which is a solvent used in the textile industry and a dry cleaning solvent. Although it is not known precisely when the wells became contaminated, the Department of Health and Human Services' (HHS) Agency for Toxic Substances and Disease Registry (ATSDR), which is investigating the issue, has estimated that the contamination may have begun as early as the 1950s. According to ATSDR, the VOCs of primary concern at Camp Lejeune were TCE and PCE, and the agency notes that exposure to these chemicals may cause adverse health effects. For example, exposure to low levels of TCE may cause headaches and difficulty concentrating.[2] Exposure to high levels of both TCE and PCE may cause dizziness, headaches, nausea, unconsciousness, cancer, and possibly death.[3]

Former residents of Camp Lejeune have taken legal action against the federal government for injuries alleged to have resulted from exposure to the contaminated water. As of June 2007, about 850 former residents and former employees of Camp Lejeune have filed tort claims with the Department of the Navy related to the past drinking water contamination. Two of these claims have resulted in the filing of lawsuits in Federal District Courts in Texas and Mississippi.[4] In addition, some former residents have expressed concern over the Marine Corps' handling of and response to the drinking water contamination, noting that even though contaminants were detected as early as 1980, the wells that were determined to be contaminated were not removed from service until 1985. Some former residents have also asserted that there have been delays in the provision of funding and information from the Department of Defense (DOD) to ATSDR.[5]

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[1] Water testing was conducted at Camp Lejeune in preparation for meeting future drinking water regulations and to address concerns about chemicals that had been buried on base.

[2] According to ATSDR, health effects from exposure to low levels of PCE are unknown.

[3] ATSDR did not define "low levels" or "high levels" of TCE or PCE.

[4] *Snyder et al. v. U.S.*, Civ. No. 627 (S.D. Miss. filed July 27, 2004); *Gros et al. v. U.S.*, Civ. No. 4665 (S. D. Tex. filed Dec. 13, 2004). The Federal Tort Claims Act requires that a claim must be presented in writing within 2 years after the claim accrues and that after a claim has been filed the agency has 6 months to make a decision. If the claim is denied or if no decision has been made after 6 months, the individual can then file a lawsuit against the federal government. 28 U.S.C. § 2675. The lawsuits were filed in the districts where the individuals resided at the time.

My statement is based on our May 11, 2007 report, *Defense Health Care: Activities Related to Past Drinking Water Contamination at Marine Corps Base Camp Lejeune* (GAO-07-276). For this report, the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 directed that we study and report on the past drinking water contamination and related adverse health effects at Camp Lejeune, including identifying the type, source, and duration of the contamination and determining the actions taken to address the contamination, and assessing the current ATSDR health study.[6] My remarks today will summarize our findings related to the history of events related to drinking water contamination at Camp Lejeune, specifically, (1) efforts to identify and address the past contamination; (2) the provision of funding and information from DOD to ATSDR for its work related to the past contamination at Camp Lejeune; and (3) an assessment by an independent panel of experts of the design of the current ATSDR health study, including the study's population, the exposure time frame, selected health effects being measured, and the reasonableness of the projected completion date.

To do this work, we reviewed more than 1,600 documents related to past and current drinking water activities at Camp Lejeune. We focused our review on the past TCE and PCE contamination[7] because ATSDR had noted that these chemicals were the VOCs of primary concern at Camp Lejeune. However, we also reviewed documentation regarding other VOCs detected at Camp Lejeune. For this testimony we focused on contamination in Camp Lejeune's Hadnot Point, Tarawa Terrace, and Holcomb Boulevard water systems, as they provided drinking water to most of the installation's housing areas during the period of interest. We interviewed current and former officials from various DOD entities, including Camp Lejeune, Headquarters Marine Corps, and the Department of the Navy, to obtain information about the history of events related to the past drinking water contamination at Camp Lejeune, including efforts to identify and address the contamination. The current and former officials interviewed often provided information based on their memory of events that occurred more than 20 years ago. We attempted to corroborate their testimonial evidence with documentation whenever possible. The former officials we interviewed were responsible for environmental activities at Camp Lejeune or the Department of the Navy during the time in which the contamination was detected. The current officials we interviewed are responsible for environmental activities at Camp Lejeune, Headquarters Marine Corps, or the Department of the Navy. Some of these current officials were also responsible for environmental activities during the time in which the contamination was detected. We also met with 19 interested former residents and individuals who worked on the base during the 1960s, 1970s, and 1980s, in order to obtain their perspective on historical events and to learn about their concerns related to the drinking water contamination. A former resident who is active in matters related to the past drinking water contamination at Camp Lejeune identified most of the interested former residents; others were identified at an ATSDR public meeting. Additionally, we examined reports from and interviewed officials with the Environmental Protection Agency (EPA) and with the North Carolina Department of Environment and Natural Resources who were knowledgeable about activities and costs related to the cleanup of the suspected sources of contamination. We also interviewed ATSDR officials and reviewed ATSDR's Camp Lejeune-related documents and publications, including a 1997 public health assessment and an ATSDR health study released in 1998. We also interviewed officials with the Department of the Navy and the U.S. Army Center for Health Promotion and Preventive Medicine, which serves as a liaison between DOD and ATSDR. To assess the design of the current ATSDR health study, we contracted with the National Academy of Sciences (NAS) to convene a panel of seven subject area experts for a 1-day meeting. The expert panel was charged with evaluating the study's population, exposure time frame, selected health effects, and completion date. We relied primarily on information gleaned from the expert panel meeting and the panel experts' subsequent written responses to the set of questions that were discussed during the 1-day meeting. Not all panel members commented individually about each of the questions discussed during the 1-day meeting. Additionally, some panel members noted that certain questions addressed subjects that were outside their areas of expertise. We also reviewed study-related documentation furnished by officials from ATSDR, the Marine Corps, and the Navy Environmental Health Center, and interviewed officials from those agencies. We conducted our work from May 2005 through April 2007 in accordance with generally accepted government auditing standards.

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[5] DOD is required by law to provide funding and data as necessary for ATSDR to carry out certain health-related activities, including public health assessments.

[6] Pub. L. No. 108-375, § 317, 118 Stat. 1811, 1844.

[7] Throughout this testimony we use the term "contamination," which is also used by the law requiring us to do this work, as well as by the EPA and DOD, to describe the drinking water at Camp Lejeune in the early 1980s. However, EPA had not yet established maximum contaminant levels for the chemicals TCE and PCE during this period. *See* 40 C.F.R. §§ 141.2 and 141.12 (1975-1985).

In summary, we found that efforts to identify and address past drinking water contamination at Camp Lejeune began in the 1980s, when the Navy initiated water testing, and are continuing with long-term cleanup and monitoring. In 1980, VOCs, including TCE, were first detected at Camp Lejeune during an analysis by a Navy-contracted laboratory that combined treated water from all base water systems. During the same year, the Navy began monitoring Camp Lejeune's treated water for total trihalomethanes (TTHMs), contaminants that are a by-product of the water treatment process. The TTHM monitoring indicated interference from unidentified chemicals. In 1982 and 1983, continued TTHM monitoring identified TCE and another VOC, PCE, as contaminants in two separate water systems that served base housing areas, Hadnot Point and Tarawa Terrace. Sampling results indicated that the levels of TCE and PCE found in the water systems varied. Former Camp Lejeune environmental officials said that they did not take additional steps to address the contamination after TCE and PCE were identified. The former officials recalled that they did not act because at that time they had little knowledge about TCE and PCE, there were no drinking water regulations that gave enforceable limits for these chemicals, and variation in water testing results raised questions about the tests' validity. Also in 1982, a Navy environmental program began investigating potentially contaminated sites at many Marine Corps and Navy bases, including Camp Lejeune. Testing initiated under that program in 1984 and 1985 found that individual wells in the Hadnot Point and Tarawa Terrace water systems were contaminated with TCE, PCE, and other VOCs. Camp Lejeune officials removed 10 contaminated wells from service in 1984 and 1985. Camp Lejeune officials determined that several areas on base where hazardous waste and other materials were disposed of may have been the sources of contamination for the Hadnot Point water system, and North Carolina environmental officials determined that an off-base dry cleaner was the likely source of contamination for the Tarawa Terrace water system. Efforts are ongoing by ATSDR to determine when contamination at Hadnot Point began. In 2006, ATSDR estimated that well contamination from the off-base dry cleaner began as early as 1957. In 1989, both Camp Lejeune and the off-base dry cleaner were placed on EPA's National Priorities List.

Regarding the provision of funding and information from DOD to ATSDR for its work related to the past contamination at Camp Lejeune, we found that since ATSDR began its Camp Lejeune-related work in 1991, the agency has not always received requested DOD funding and experienced delays in receiving information from DOD. For example, for 3 of the 16 fiscal years during which ATSDR has conducted its Camp Lejeune-related work (fiscal years 1998 through 2000), no funding was provided to ATSDR by the Navy or any DOD entity. ATSDR also had difficulties getting documents needed from Camp Lejeune while it was conducting a public health assessment for the base. However, ATSDR officials said that while funding and access to records were probably slowed down and their Camp Lejeune related work made more expensive by DOD officials' actions, their actions did not significantly impede ATSDR's Camp Lejeune-related health study efforts. The ATSDR officials also stated that while issues such as limitations in access to DOD data had to be addressed, such situations are normal during the course of a study.

The experts convened by NAS to assess the design of the current ATSDR health study generally agreed that many parameters of ATSDR's current study are appropriate. Regarding the study population, all seven panel experts agreed that ATSDR's study population of individuals who were potentially exposed in utero to the contaminated drinking water at Camp Lejeune between 1968 and 1985 was appropriate, as this population was arguably the most vulnerable to the effects of the contamination. Panel experts generally agreed that the 1968-1985 study time frame was reasonable, based on limitations in data availability for the years prior to 1968. Regarding the health effects studied, five of the seven panel experts discussed health effects and said that the selected birth defects and childhood cancers were relevant. Regarding the proposed completion date, the panel experts had mixed opinions: three of the five panel experts who commented said that the projected December 2007 date appeared reasonable, while two said that the date might be optimistic.

DOD, EPA, and HHS provided technical comments on a draft of the May 11, 2007 report, which we incorporated where appropriate. We provided the seven former Camp Lejeune residents who are members of an ATSDR community assistance panel for Camp Lejeune the opportunity to provide comments on our draft—three of the panel members provided both technical and general oral comments, and four declined to review the draft report. The three panel members commented generally on issues such as VOCs other than TCE and PCE that have been detected at Camp Lejeune, compensation and health benefits for former residents, and additional notification for former residents. We incorporated the panel members' technical comments where appropriate, but some issues they discussed were beyond the scope of the report.

Background

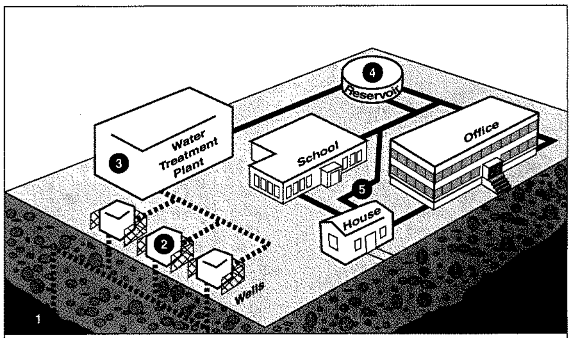
Drinking water can come from either groundwater sources, via wells, or from surface water sources, such as rivers, lakes, and streams. All sources of drinking water contain some naturally occurring contaminants. As water flows in streams, sits in lakes, and filters thorough layers of soil and rock in the ground, it dissolves or absorbs the substances that it touches. Some of these contaminants are harmless, but others can pose a threat to drinking water, such as improperly disposed-of chemicals, pesticides, and certain naturally occurring substances. Likewise, drinking water that is not properly treated or disinfected, or which travels through an improperly maintained water system, may pose a health risk. However, the presence of contaminants does not necessarily indicate that water poses a health risk—all drinking water may reasonably be expected to contain at least small amounts of some contaminants. As of July 2006, EPA had set standards for approximately 90 contaminants in drinking water that may pose a risk to human health. According to EPA, water that contains small amounts of these contaminants, as long as they are below EPA's standards, is safe to drink. However, EPA notes that people with severely compromised immune systems and children may be more vulnerable to contaminants in drinking water than the general population.

General Information about Camp Lejeune and Its Water Systems

Camp Lejeune covers approximately 233 square miles in Onslow County, North Carolina, and includes training schools for infantry, engineers, service support, and medical support, as well as a Naval Hospital and Naval Dental Center. The base has nine family housing areas, and families live in base housing for an average of 2 years. Base housing at Camp Lejeune consists of enlisted family housing, officer family housing, and bachelor housing (barracks for unmarried service personnel). Additionally, schools, day care centers, and administrative offices are located on the base. Approximately 54,000 people currently live and work at Camp Lejeune, including about 43,000 active duty personnel and 11,000 military dependents and civilian employees.

In the 1980s, Camp Lejeune obtained its drinking water from as many as eight water systems, which were fed by more than 100 individual wells that pumped water from a freshwater aquifer located approximately 180 feet below the ground. Each of Camp Lejeune's water systems included wells, a water treatment plant, reservoirs, elevated storage tanks, and distribution lines to provide the treated water to the systems' respective service areas. Drinking water at Camp Lejeune has been created by combining and treating groundwater from multiple individual wells that are rotated on and off, so that not all wells are providing water to the system at any given time. Water is treated in order to remove minerals and particles and to protect against microbial contamination. (See fig. 1 for a description of how a Camp Lejeune water system operates.)

Figure 1: Conceptual Model of a Camp Lejeune Water System



❶ The drinking water at Camp Lejeune is obtained from groundwater pumped from a freshwater aquifer located approximately 180 feet below the ground. ❷ Groundwater is pumped through wells located near the water treatment plant. ❷ In the water treatment plant, the untreated water is mixed and treated through several processes: removal of minerals to soften the water, filtration through layers of sand and carbon to remove particles, chlorination to protect against microbial contamination, and fluoride addition to help prevent tooth decay. ❹ After the water is treated, it is stored in ground and elevated storage reservoirs. ❺ When needed, treated water is pumped from the reservoirs and tanks to facilities such as offices, schools, or houses on the base.

▪▪▪▪▪▪ Untreated water

▬▬ Treated water

Sources: GAO, Art Explosion, and Marine Corps Base Camp Lejeune.

Note: Water treatment processes may not remove all contaminants present in untreated water.

From the 1970s through 1987, Hadnot Point, Tarawa Terrace, and Holcomb Boulevard water systems provided drinking water to most of Camp Lejeune's housing areas. The water treatment plants for the Hadnot Point and Tarawa Terrace water systems were constructed during the 1940s and 1950s. The water treatment plant for the Holcomb Boulevard water system began operating at Camp Lejeune in 1972; prior to this time, the Hadnot Point water system provided water to the Holcomb Boulevard service area. In the 1980s, each of these three systems had between 8 and 35 wells that could provide water to their respective service areas. In 1987 the Tarawa Terrace water treatment plant was shut down and the Holcomb Boulevard water distribution system was expanded to include the Tarawa Terrace water service area.

Generally, housing units served by the Tarawa Terrace and Holcomb Boulevard water systems consisted of family housing, which included single- and multifamily homes and housing in trailer parks. Housing units served by the Hadnot Point water system included mainly bachelor housing with limited family housing. Based on available housing data for the late 1970s and the 1980s,[8] the estimated annual averages of the number of people living in family housing units[9] served by these water systems at that time were:

- 5,814 people in units served by the Tarawa Terrace water system,
- 6,347 people in units served by the Holcomb Boulevard water system, and
- 71 people in units served by the Hadnot Point water system.

In addition to serving housing units, all three water systems provided water to base administrative offices. The Tarawa Terrace, Holcomb Boulevard, and Hadnot Point water systems also served schools and other recreational areas. Additionally, the Hadnot Point water system also served an industrial area and the base hospital.

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[8] To determine the estimated annual average of people who lived in family housing units served by these four water systems, we used limited housing data from 1977 to 1989 provided to us by Camp Lejeune officials. Camp Lejeune officials could not provide housing data prior to 1977.

[9] Camp Lejeune housing officials could not provide occupancy rates for bachelor housing.

Department of the Navy Environmental Functions

Certain Navy entities provide support functions for Marine Corps bases such as Camp Lejeune. Two entities provide support for environmental issues:

- The Naval Facilities Engineering Command began providing environmental support for bases in the 1970s. The Naval Facilities Engineering Command, Atlantic Division (LANTDIV) provides environmental support for Navy and Marine Corps bases in the Atlantic and mid-Atlantic regions of the United States.[10] For example, LANTDIV officials work with Camp Lejeune officials to establish environmental cleanup priorities and cost estimates and to allocate funding to ensure compliance with state and federal environmental regulations.
- The Navy Environmental Health Center (NEHC) has provided environmental and public health consultation services for Navy and Marine Corps environmental cleanup sites since 1991. NEHC is also designated as the technical liaison between Navy and Marine Corps installations and ATSDR and, as a part of this responsibility, reviews and comments on all ATSDR reports written for Navy and Marine Corps sites prior to publication. Prior to 1991, no agency was designated to provide public health consultation services for Navy and Marine Corps sites.

In 1980, the Department of the Navy established the Navy Assessment and Control of Installation Pollutants (NACIP) program to identify, assess, and control environmental contamination from past hazardous material storage, transfer, processing, and disposal operations. Under the NACIP program, initial assessment studies were conducted to determine the potential for environmental contamination at Navy and Marines Corps bases. If, as a result of the study, contamination was suspected, a follow-up confirmation study and corrective measures were initiated. In 1986 the Navy replaced its NACIP program with the Installation Restoration Program. The purpose of the Installation Restoration Program is to reduce, in a cost-effective manner, the risk to human health and the environment from past waste disposal operations and hazardous material spills at Navy and Marine Corps bases. Cleanup is done in partnership with EPA, state regulatory agencies, and members of the community.

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[10] LANTDIV also manages the planning, design, construction, contingency engineering, real estate, and public works support at Navy and Marine Corps facilities in the United States.

Environmental Laws and Regulations Related to Drinking Water Contamination and Hazardous Waste Contamination at Camp Lejeune

Congress passed the Safe Drinking Water Act in 1974[11] to protect the public's health by regulating the nation's public drinking water supply. The Safe Drinking Water Act, as amended, is the key federal law protecting public water supplies from harmful contaminants. For example, the act requires that all public water systems conduct routine tests of treated water to ensure that the water is safe to drink. Required water testing frequencies vary and range from weekly testing for some contaminants to testing every 3 years for other contaminants. The act also established a federal-state arrangement in which states may be delegated primary implementation and enforcement authority for the drinking water program. For contaminants that are known or anticipated to occur in public water systems and that EPA determines may have an adverse impact on health, the act requires EPA to set a nonenforceable maximum contaminant level goal, at which no known or anticipated adverse health effects occur and that allows an adequate margin of safety. Once the maximum contaminant level goal is established, EPA sets an enforceable standard for water as it leaves the treatment plant, the maximum contaminant level. A maximum contaminant level is the maximum permissible level of a contaminant in water delivered to any user of a public water system. The maximum contaminant level must be set as close to the goal as is feasible using the best technology or other means available, taking costs into consideration. The North Carolina Department of Environment and Natural Resources and its predecessors[12] have had primary responsibility for implementation of the Safe Drinking Water Act in North Carolina since 1980.

In 1979, EPA promulgated final regulations applicable to certain community water systems establishing the maximum contaminant levels for the control of TTHMs, which are a type of VOC that are formed when disinfectants—used to control disease-causing contaminants in drinking water—react with naturally occurring organic matter in water. The regulations required that water systems that served more than 10,000 people and that added a disinfectant as part of the drinking water treatment process begin mandatory water testing for TTHMs by November 1982 and comply with the maximum contaminant level by November 1983. TCE and PCE were not among the contaminants included in these regulations.

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[11] Pub. L. No. 93-523, 88 Stat. 1660 (codified, as amended, at 42 U.S.C. §§ 300f et seq.).

[12] In the 1980s, the North Carolina Department of Human Resources administered the Safe Drinking Water Act and the Department of Natural Resources and Community Development was responsible for other environmental functions in the state of North Carolina. In 1989, sections of these departments underwent a reorganization and name change, becoming the Department of Environment, Health, and Natural Resources. In 1997, the department was again reorganized and took on its current name, the Department of Environment and Natural Resources.

In 1979 and 1980, EPA issued nonenforceable guidance establishing "suggested no adverse response levels" for TCE and PCE in drinking water and in 1980 issued "suggested action guidance" for PCE in drinking water.[13] Suggested no adverse response levels provided EPA's estimate of the short- and long-term exposure to TCE and PCE in drinking water for which no adverse response would be observed and described the known information about possible health risks for these chemicals. Suggested action guidance recommended remedial actions within certain time periods when concentrations of contaminants exceeded specific levels. Suggested action guidance was issued for PCE related to drinking water contamination from coated asbestos-cement pipes, which were used in water distribution lines.

The initial regulation of TCE and PCE under the Safe Drinking Water Act began in 1989 and 1992, respectively, when maximum contaminant levels became effective for these contaminants. (See table 1 for the suggested no adverse response levels, suggested action guidance, and maximum contaminant level regulations for TCE and PCE.)

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[13] Neither issuance was published in *The Federal Register*.

Table 1: EPA Guidance and Regulations for Trichloroethylene (TCE) and Tetrachloroethylene (PCE) in Drinking Water

	Nonenforceable guidance						Enforceable regulation
	Suggested no adverse response level[a] for various exposure periods in parts per billion (ppb) issued in 1979 (TCE) and 1980 (PCE)			Suggested action guidance[b] for various exposure periods in ppb issued in 1980 (PCE)			Maximum contaminant level in milligrams per liter (mg/l) and ppb[c] effective in 1989 (TCE) and 1992 (PCE)
Chemical	**1-Day[d]**	**10-Day[e]**	**Long-term[f]**	**1-Day[d]**	**10-Day[e]**	**Long-term[f]**	
TCE	2,000	200	75	N/A[g]	N/A[g]	N/A[g]	0.005 mg/l or 5 ppb
PCE	2,300	175	20	2,300	180	40	0.005 mg/l or 5 ppb

Source: GAO analysis of EPA data.

[a] Suggested no adverse response levels are EPA-issued nonenforceable guidance for community water systems regarding TCE and PCE in drinking water.

[b] Suggested action guidance is EPA-issued nonenforceable guidance suggesting that remedial action be taken when PCE exceeded specific levels.

[c] These are the maximum permissible levels of a contaminant in water that is delivered to a public water system. Maximum contaminant levels are not specific to period of exposure. The maximum contaminant level for TCE became effective in 1989. *See 52. Fed. Reg.* 25716 (July 8, 1987). The maximum contaminant level for PCE became effective in 1992. *See 52. Fed. Reg.* 3593 (Jan. 30, 1991). The maximum contaminant levels were issued in milligrams per liter. EPA also reports these contaminant levels in the equivalent ppb.

[d] One-day suggested no adverse response levels and suggested action guidance were the maximum levels for one 24-hour period of exposure.

[e] Ten-day suggested no adverse response levels and suggested action guidance were the maximum levels each day for 10 days of exposure.

[f] Long-term suggested no adverse response levels and suggested action guidance were the maximum levels each day for long-term exposure. Long-term exposure was based on a 70-year exposure.

[g] There was no suggested action guidance for TCE.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980[14] established what is known as the Superfund program to clean up highly contaminated waste sites and address the threats that these sites pose to human health and the environment, and assigned responsibility to EPA for administering the program.[15] CERCLA was amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986.[16] Among other things, SARA requires that federal agencies, including DOD, that own or operate facilities on EPA's CERCLA list of seriously contaminated sites, known as the National Priorities List, enter into an interagency agreement with EPA.[17] The agreement is to specify what cleanup activities, if any, are required and to set priorities for carrying out those activities.[18] SARA also established the Defense Environmental Restoration Program, through which DOD conducts environmental cleanup activities at military installations.[19] Under the environmental restoration program, DOD's activities addressing hazardous substances, pollutants, or contaminants are required to be carried out consistent with the provisions of CERCLA governing environmental cleanups at federal facilities.[20] Based on environmental contamination at various areas on the base, Camp Lejeune was designated as a National Priorities List site in 1989. EPA, the Department of the Navy, and the state of North Carolina entered into a Federal Facilities Agreement concerning cleanup of Camp Lejeune with an effective date of March 1, 1991.

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[14] Pub. L. No. 96-510, 94 Stat. 2767 (codified, as amended, at 42 U.S.C. §§ 9601 et seq.).

ATSDR's Assessment of the Adverse Health Effects of Hazardous Substances at DOD Superfund Sites

ATSDR was created by CERCLA and established within the Public Health Service of HHS in April 1983 to carry out Superfund's health-related activities. These activities include conducting health studies, laboratory projects, and chemical testing to determine relationships between exposure to toxic substances and illness. In 1986, SARA expanded

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[15] At privately owned sites, EPA can require that responsible parties either perform the cleanup themselves or reimburse EPA for the costs of Superfund-funded cleanups. Federal agencies generally must pay for cleanups and other Superfund activities from their own appropriations.

[16] Pub. L. No. 99-499, 100 Stat. 1613 (1986) (codified, as amended, at various sections of titles 10, 26, 29, and 42 U.S.C.).

[17] To determine which sites are eligible for listing on the National Priorities List, EPA uses the Hazard Ranking System, a numerical scoring system that assesses the hazards a site poses to human health and the environment as its principal determining factor. Once EPA has determined that the risks posed by a site make it eligible for the National Priorities List, EPA regions then consider many other factors in selecting the sites to submit to EPA headquarters for proposal to be added to the National Priorities List.

[18] *See* 42 U.S.C. § 9620(e).

[19] *See* 10 U.S.C. §§ 2701-2709.

[20] *See* 10 U.S.C. § 2701(a)(2).

ATSDR's responsibilities to include, among other things, conducting public health assessments, toxicological databases, information dissemination, and medical education. SARA requires that ATSDR conduct a public health assessment at each site proposed for or on the National Priorities List, and that ATSDR conduct additional follow-up health studies if needed. Potentially responsible parties, including federal agencies, are liable for the costs of any health assessment or health effects study carried out by ATSDR.[21]

SARA requires that ATSDR and DOD enter into a memorandum of understanding to set forth the authorities, responsibilities, and procedures between DOD and ATSDR for conducting public health activities at DOD Superfund sites.[22] Based on the memorandum of understanding signed between ATSDR and DOD, ATSDR is required to submit an annual plan of work to DOD, in which it must describe the public health activities it plans to conduct at DOD sites in the following fiscal year, as well as the amount of funding required to conduct these activities. After the annual plan of work has been submitted, DOD has 45 days to respond and negotiate the scope of work to be conducted by ATSDR. The memorandum of understanding states that DOD must seek sufficient funding through the DOD budgetary process to carry out the work agreed upon.

From 1991 to 1997, ATSDR conducted a public health assessment at Camp Lejeune that was required by law because of the base's listing on the National Priorities List. The health assessment evaluated several ways in which people on base had been exposed to hazardous substances, including exposure to the VOC-contaminated drinking water.[23] In its 1997 report, ATSDR recommended that a study be carried out to evaluate the risks of childhood cancer in those who were exposed in utero to the contaminated drinking water and also noted that adverse pregnancy outcomes were of concern. In 1995, while the health assessment was being conducted, ATSDR initiated a study to determine whether there was an association between exposure to VOCs in drinking water and specific adverse pregnancy outcomes among women who had lived at Camp

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[21] *See* 42 U.S.C. § 9607(a)(4)(D).

[22] *See* 10 U.S.C. § 2704(c).

[23] While conducting the health assessment, ATSDR also considered two other types of past exposures at Camp Lejeune as possibly posing a public health hazard: lead in tap water and pesticides in soil at a former day care facility.

Lejeune from 1968 through 1985.[24] The study, released in 1998, originally concluded that there was a statistically significant elevated risk for several poor pregnancy outcomes, including (1) small for gestational age among male infants born to mothers living at Hadnot Point, (2) small for gestational age for infants born to mothers over 35 years old living at Tarawa Terrace, and (3) small for gestational age for infants born to mothers with two or more prior fetal losses living at Tarawa Terrace.[25] However, ATSDR officials said they are reanalyzing the findings of this study because of an error in the original assessment of exposure to VOCs in drinking water. While the study originally assessed births from 1968 to 1972 in the Holcomb Boulevard service area as being unexposed to VOCs, these births were exposed to contaminants from the Hadnot Point water system. An ATSDR official said the reanalysis may alter the study's results.

In 1999, ATSDR initiated its current study examining whether certain birth defects and childhood cancers are associated with exposure to TCE or PCE at Camp Lejeune. The study examines whether individuals born during 1968 through 1985 to mothers who were exposed to the contaminated drinking water at any time while they were pregnant and living at Camp Lejeune were more likely than those who were not exposed to have neural tube defects, oral cleft defects, or childhood hematopoietic cancers.[26] The current study began with a survey to identify potential cases of the selected birth defects and childhood cancers. The study is also using water modeling[27] to help ATSDR determine the potential sources of past contamination and estimate when the water became contaminated and which housing units received the contaminated water. The water modeling data will help ATSDR identify which pregnant women may have been exposed to the contaminated water, and will also help ATSDR estimate the amount of TCE and PCE that may have been in the drinking water. ATSDR officials said that the study is expected to be completed by December 2007.

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[24] Although there was no evidence of an increased rate of adverse pregnancy outcomes at Camp Lejeune at that time, the 1998 study report states that the agency believed it was prudent to research this topic because fetuses tend to be more sensitive to toxic chemical exposures and many pregnant women had resided in housing areas supplied with contaminated water. In addition to small for gestational age, other adverse pregnancy outcomes evaluated in the study included pre-term birth and mean birth weight.

[25] U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry, *Volatile Organic Compounds in Drinking Water and Adverse Pregnancy Outcomes* (Atlanta, Ga.: 1998).

[26] Childhood hematopoietic cancers include childhood leukemia and non-Hodgkin's lymphoma.

[27] Water modeling is a scientific method that is used to help estimate past water system conditions.

Possible Adverse Health Effects of TCE and PCE

According to ATSDR's Toxicological Profile, inhaling small amounts of TCE may cause headaches, lung irritation, poor coordination, and difficulty concentrating, and inhaling or drinking liquids containing high levels of TCE may cause nervous system effects, liver and lung damage, abnormal heartbeat, coma, or possibly death.[28] ATSDR also notes that some animal studies suggest that high levels of TCE may cause liver, kidney, or lung cancer, and some studies of people exposed over long periods to high levels of TCE in drinking water or workplace air have shown an increased risk of cancer. ATSDR's Toxicological Profile notes that the National Toxicology Program has determined that TCE is reasonably anticipated to be a human carcinogen and the International Agency for Research on Cancer has determined that TCE is probably carcinogenic to humans. Unlike TCE, the health effects of inhaling or drinking liquids containing low levels of PCE are unknown, according to ATSDR. However, ATSDR reports that exposure to very high concentrations of PCE may cause dizziness, headaches, sleepiness, confusion, nausea, difficulty in speaking and walking, unconsciousness, or death.[29] HHS has determined that PCE may reasonably be anticipated to be a carcinogen.

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[28] ATSDR did not define "small amounts" or "high levels" of TCE. According to ATSDR's Toxicological Profiles, when exposure to TCE or PCE occurs many factors determine whether an individual will be harmed. These factors include the amount of exposure, duration of exposure, and how an individual came in contact with these chemicals (i.e., ingestion, inhalation, or contact with the skin).

[29] ATSDR did not define "low levels" or "high concentrations" of PCE.

Efforts to Identify and Address Past Drinking Water Contamination at Camp Lejeune Began in the 1980s and Continue with Long-term Cleanup and Monitoring

Efforts to identify and address past drinking water contamination at Camp Lejeune began in the 1980s, when the Navy initiated water testing at Camp Lejeune. In 1980, one water test identified the presence of VOCs and a separate test indicated contamination by unidentified chemicals. In 1982 and 1983, water monitoring for TTHMs by a laboratory contracted by Camp Lejeune led to the identification of TCE and PCE as the contaminants in two water systems at Camp Lejeune. Sampling results indicated that the levels of TCE and PCE varied. Former Camp Lejeune environmental officials said they did not take additional steps to address the contamination after TCE and PCE were identified. The former officials recalled that they did not take additional steps because at that time they had little knowledge of TCE and PCE, there were no regulations establishing enforceable limits for these chemicals in drinking water, and variations in water testing results raised questions about the tests' validity. In 1984 and 1985, the NACIP program identified VOCs, including TCE and PCE, in 12 of the wells serving the Hadnot Point and Tarawa Terrace water systems. Camp Lejeune officials removed 10 wells from service in 1984 and 1985. Additionally, information about the contamination was provided to residents. Upon investigating the contamination, DOD and North Carolina officials concluded that both on- and off-base sources were likely to have caused the contamination in the Hadnot Point and Tarawa Terrace water systems. Since 1989, federal, state, and Camp Lejeune officials have partnered to take actions to clean up the sources of contamination and to monitor and protect the base's drinking water.

Navy Water Testing Beginning in 1980 Identified VOCs in Camp Lejeune Water Systems

The presence of VOCs in Camp Lejeune water systems was first detected in October 1980. On October 1, 1980, samples of water were collected from all eight water systems at Camp Lejeune by an official from LANTDIV, a Navy entity that provided environmental support to Camp Lejeune. The water samples were combined into a single sample, and a "priority pollutant scan" was conducted in order to detect possible contaminants in the water systems. The results of this analysis, conducted by a Navy-contracted private laboratory and sent to LANTDIV, identified 11 VOCs, including TCE, at their detection limits, that is, the lowest level at which the chemicals could be reliably identified by the instruments being used.[30]

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[30] Additionally, two metals—cadmium and selenium—were identified at levels slightly above detection limits.

Separately, in 1980 the Navy began monitoring programs for TTHMs at various Navy and Marine Corps bases, including Camp Lejeune, in preparation for meeting a future EPA drinking water regulation.[31] LANTDIV arranged for an Army laboratory to begin testing the treated water from two Camp Lejeune water systems, Hadnot Point and New River, in October 1980. At that time, these two water systems were the only ones that served more than 10,000 people and therefore would be required to meet the future TTHM regulation. From October 1980 to September 1981, eight samples were collected from the Hadnot Point water system and analyzed for TTHMs. Results from four of the eight samples indicated the presence of unidentified chemicals that were interfering with the TTHM analyses.[32] Reports for each of the four analyses contained an Army laboratory official's handwritten notes about the unidentified chemicals: two of the notes classified the water as "highly contaminated" and notes for the other two analyses recommended analyzing the water for organic compounds.

The exact date when LANTDIV officials began receiving results from TTHM testing is not known, and LANTDIV officials told us that they had no recollection of how or when the results were communicated from the Army laboratory. Available Marine Corps documents indicate that Camp Lejeune environmental officials[33] learned in July 1981 that LANTDIV had been receiving the results of TTHM testing and was holding the results until all planned testing was complete. Subsequently, Camp Lejeune environmental officials requested copies of the TTHM results that LANTDIV had received to date, and LANTDIV provided these results in

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[31] According to an August 1980 memorandum, which cited a 1979 amendment to the National Interim Primary Drinking Water Regulations, LANTDIV initiated monitoring programs at various naval facilities, including Camp Lejeune, in order to develop a TTHM database prior to the effective dates for the enforcement of the maximum contaminant levels. For Camp Lejeune community water systems such as Hadnot Point and New River that served 10,000 to 74,999 individuals, the maximum contaminant levels for TTHMs took effect in November 1983 and an EPA requirement to begin monitoring TTHM levels in the systems began 1 year prior to that date. *See* 44 *Fed. Reg.* 68641 (Nov. 29, 1979) (to be codified at 40 C.F.R. § 141.6).

[32] The results from the other four samples did not note the presence of unidentified chemicals.

[33] In the early 1980s the environmental staff at Camp Lejeune consisted of three primary staff members: a director specializing in natural resources, a supervisory ecologist, and a chemist. These staff members were responsible for water monitoring and compliance with environmental regulations, among other responsibilities. Over time as environmental laws have changed, the environmental staff has grown and obtained additional responsibilities.

August 1981. The next documented correspondence from LANTDIV to Camp Lejeune regarding TTHM monitoring occurred in a February 1982 memorandum in which LANTDIV recommended that TTHM monitoring be expanded to all of Camp Lejeune's water systems and noted that Camp Lejeune should contract with a North Carolina state-certified laboratory for the testing. Current and former LANTDIV officials recalled that their agency played a limited role in providing information or guidance regarding environmental issues at Camp Lejeune, and that this assistance generally would have been at the request of Camp Lejeune officials. However, former Camp Lejeune environmental officials recalled that at that time they had little experience in water quality issues and relied on LANTDIV to serve as their environmental experts.

Further Tests Identified TCE and PCE in Two Camp Lejeune Water Systems in 1982 and 1983; Camp Lejeune Officials Do Not Recall Taking Action to Address the Contamination at That Time

Following LANTDIV's recommendation to expand TTHM monitoring to all base water systems, Camp Lejeune officials contracted with a private state-certified laboratory to test samples of treated water from all eight of their water systems. According to an August 1982 memorandum, in May 1982 a Camp Lejeune official was informed during a telephone conversation with a private laboratory official that organic cleaning solvents, including TCE, were present in the water samples for TTHM monitoring from the Hadnot Point and Tarawa Terrace water systems. In July 1982, additional water samples from the two systems were collected in an effort to investigate the presence of these chemicals. In August 1982 the contracted laboratory sent a letter to base officials informing them that TCE and PCE were identified as the contaminants in the May and July samples. According to the letter, the testing determined that the Hadnot Point water system was contaminated with both TCE and PCE and the Tarawa Terrace water system was contaminated with PCE. The letter also noted that TCE and PCE "appeared to be at high levels" and were "more important from a health standpoint" than the TTHM monitoring. Sampling results indicated that the levels of TCE and PCE varied. The letter noted that one sample taken in May 1982 from the Hadnot Point water system contained TCE at 1,400 parts per billion and two samples taken in July 1982 contained TCE at 19 and 21 parts per billion. Four samples taken in May 1982 and July 1982 from the Tarawa Terrace water system contained levels of PCE that ranged from 76 to 104 parts per billion. (See table 2 for the May and July 1982 sampling results.)

Table 2: Sampling Results from Hadnot Point and Tarawa Terrace Water Systems for May 1982 and July 1982

		Concentrations of chemicals in parts per billion[a]	
Housing area	**Samples[b]**	**TCE[c]**	**PCE[d]**
May samples[e]			
Hadnot Point	1	1,400	15
Tarawa Terrace	2	—[f]	80
July samples			
Hadnot Point	3	19	<1
	4	21	<1
	5	No data[g]	1.0
Tarawa Terrace	6	—[f]	76
	7	—[f]	82
	8	—[f]	104

Source: GAO analysis of Headquarters Marine Corps data.

[a] The August 1982 letter from the contracted laboratory that provided these sampling results did not include the detection limit. The detection limit is the lowest level at which the chemicals could be reliably identified by the instruments being used.

[b] Camp Lejeune's samples were identified by nonconsecutive numbers. We renumbered the samples to provide consecutive number identifiers.

[c] Trichloroethylene (TCE) is a volatile organic compound typically used as a metal degreaser.

[d] Tetrachloroethylene (PCE) is a volatile organic compound typically used as a dry cleaning solvent.

[e] The May samples were analyzed in July.

[f] The laboratory did not report results for TCE in these samples.

[g] A memorandum by a Camp Lejeune environmental official indicated that this sample was analyzed for TCE, but exact quantities were not determined.

Former Camp Lejeune environmental officials recalled that after the private laboratory identified the TCE and PCE in the two water systems, they did not take additional steps to address the contamination for three reasons. First, they had limited knowledge of these chemicals; second, there were no regulations establishing enforceable limits for these chemicals in drinking water; and third, they made assumptions about why the levels of TCE and PCE varied and about the possible sources of the TCE and PCE. The former Camp Lejeune environmental officials told us that they were aware of EPA guidance, referred to as "suggested no adverse response levels," for TCE and PCE when these contaminants were identified at Camp Lejeune. However, they noted that the levels of these contaminants detected at Camp Lejeune generally were below those outlined in the guidance. One Camp Lejeune environmental official also recalled that at the time they were unsure what the health effects would be for the lower amounts detected at the base. Additionally, in an August 1982 document and during our interviews with current Camp Lejeune environmental officials, it was noted that EPA had not issued regulations under the Safe Drinking Water Act for TCE and PCE when the private laboratory identified these chemicals in the drinking water. The former Camp Lejeune environmental officials also said that they made assumptions about why the levels of TCE and PCE varied. For example, they attributed the higher levels to short-term environmental exposures, such as spilled paint inside a water treatment plant, or to laboratory or sampling errors. Additionally, in an August 1982 memorandum, a Camp Lejeune environmental official suggested that based on the sampling results provided by the private laboratory, the levels of PCE detected could be the result of using coated pipes in the untreated water lines at Tarawa Terrace. The former Camp Lejeune environmental officials told us that in retrospect, it was likely that well rotation in these water systems contributed to the varying sampling results because the contaminated wells may not have been providing water to the Hadnot Point and Tarawa Terrace systems at any given time. However, both they and current Camp Lejeune environmental officials said that at that time the base environmental staff did not know that the wells serving both systems were rotated.

After August 1982, the private laboratory continued to communicate with Camp Lejeune officials about the contamination of treated water from the Hadnot Point and Tarawa Terrace water systems. All eight of Camp Lejeune's water systems were sampled again for TTHMs in November 1982. In a December 1982 memorandum, a Camp Lejeune environmental official noted that during a phone conversation with a chemist from the private laboratory the chemist expressed concern that TCE and PCE were interfering with Tarawa Terrace and Hadnot Point TTHM samples. The chemist said the levels of TCE and PCE were "relatively high" in the November 1982 samples, though the specific levels of TCE and PCE were not provided to Camp Lejeune officials. The private laboratory report providing the November 1982 results said that the samples from Tarawa Terrace "show contamination" from PCE and the samples from Hadnot Point "show contamination" from both TCE and PCE. All eight of Camp Lejeune's water systems were sampled again for TTHMs in August 1983, and the private laboratory report providing these results said that the samples from Tarawa Terrace "show contamination" from PCE and the samples from Hadnot Point "show contamination" from both TCE and

PCE.[34] Former Camp Lejeune environmental officials recalled that they did not take any actions related to these findings.

Discovery of Contamination in Individual Wells in 1984 and 1985 Prompted Their Removal from Service, and Information Was Provided to Residents and the Media

In 1982, Navy officials initiated the NACIP program at Camp Lejeune with an initial assessment study, which was designed to collect and evaluate evidence that indicated the existence of pollutants that may have contaminated a site or that posed a potential health hazard for people located on or off a military installation. The initial assessment study determined that further investigation was warranted at 22 priority sites and a confirmation study to investigate these sites was initiated in July 1984.

As a part of the confirmation study, a Navy contractor took water samples from water supply wells located near priority sites where groundwater contamination was suspected. Current and former Camp Lejeune officials told us that previous water samples usually had been collected from treated water at sites such as reservoirs or buildings within the water systems rather than being collected directly from individual wells at Camp Lejeune. In November 1984, Camp Lejeune officials received sampling results for one Hadnot Point well located near a priority site, which showed that TCE and PCE, among other VOCs, were detected in the well. This well was removed from service, and in December 1984, water samples from six Hadnot Point wells that were located in the same general area and treated water samples from the Hadnot Point water plant were also tested. Results of the analysis of the well samples indicated that both TCE and PCE were detected in one well, TCE was detected in two additional wells, and other VOCs were detected in all six wells. Results for the treated water samples also detected TCE and PCE. Four of these six wells were removed from service in addition to the original well removed from service. For the two wells that were not taken out of service, while initial results indicated levels of VOCs, including TCE, other test results showed no detectable levels of VOCs. Documents we reviewed show that continued monitoring of those two wells indicated no detectable levels of TCE. During December 1984, seven additional samples were taken from the treated water at Hadnot Point water plant and revealed no detectable levels of TCE and PCE. According to two former Camp Lejeune environmental officials, once the wells had been taken out of service and the samples from the water plant no longer showed detectable levels of TCE or PCE, they believed the water from the Hadnot Point water system was no longer contaminated.

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[34] The reports of the November 1982 and August 1983 TTHM analyses did not provide further details about the levels of TCE and PCE detected.

Although the December 1984 testing of water from the Hadnot Point water system showed no detectable levels of TCE or PCE, in mid-January 1985 Camp Lejeune environmental staff began collecting water samples from all wells on the base. Sampling results were received in February 1985 and detected VOCs, including TCE and PCE, in 3 wells serving the Hadnot Point water system and 2 wells serving the Tarawa Terrace water system. As a result, those 5 wells were removed from service. According to current Camp Lejeune officials, all 10 wells had been removed from service by February 8, 1985. According to memoranda dated March 1985 and May 1985, 1 of the 2 wells removed from service at Tarawa Terrace was used on 1 day in March 1985 and on 3 days in April 1985 for short periods of time to meet water needs at the base. See table 3 for the dates that wells were removed from service and for the levels of TCE and PCE that were detected in the wells prior to their removal from service in 1984 and 1985. See app. I for the levels of all VOCs that were detected in the wells prior to their removal from service in 1984 and 1985.

Table 3: Dates Wells Were Removed from Service in 1984 and 1985 at Hadnot Point and Tarawa Terrace Water Systems, and TCE and PCE Levels Detected in Each Well Prior to Removal from Service

Water systems	Wells	Date removed from service	Concentrations of chemicals in parts per billion[a]	
			TCE[b]	PCE[c]
Hadnot Point	602	Nov. 30, 1984	1,600	24
	601	Dec. 6, 1984	210	5
	608	Dec. 6, 1984	110	ND
	634[d]	Dec. 14, 1984	ND	ND
	637[d]	Dec. 14, 1984	ND	ND
	651	Feb. 4, 1985	3,200	386
	652	Feb. 8, 1985	9	ND
	653	Feb. 8, 1985	5.5	ND
Tarawa Terrace	TT-26	Feb. 8, 1985	57	1,580
	TT-23[e]	Feb. 8, 1985	ND	132

Source: GAO analysis of Headquarters Marine Corps data.

Notes: The detection limit for the instruments used to analyze the samples was 10 parts per billion. The detection limit is the lowest level at which the chemicals could be reliably identified by the instruments being used. A Marine Corps document providing the sampling results stated that ND meant "none detected."

[a] The concentrations provided are those detected prior to each well's removal from service and are one-time sampling results. We did not find documentation that tied the decision to remove the wells from service to any particular level of contamination included in related EPA guidance or enforceable regulation. DOD sampling also detected other VOCs. (See app. I.)

[b] Trichloroethylene (TCE) is a volatile organic compound typically used as a metal degreaser.

[c] Tetrachloroethylene (PCE) is a volatile organic compound typically used as a dry cleaning solvent.

[d] TCE and PCE were not detected in this well prior to its removal from service. Documents indicate that this well was taken out of service after detection of "significant levels" of methylene chloride, a VOC used in various industrial processes such as paint stripping, paint remover manufacturing, and metal cleaning and degreasing.

[e] Tarawa Terrace well TT-23 is also referred to as "TT-new well" in Marine Corps documents.

In addition, while base officials were waiting for sampling results from January 1985 of samples collected from wells serving Hadnot Point, water from this system was provided to a third water system for about 2 weeks. In late January 1985, a fuel line break caused gasoline to leak into the Holcomb Boulevard water treatment plant. During the approximately 2-week period the treatment plant was shut down, water from the Hadnot Point system was pumped into the Holcomb Boulevard water lines. Former Camp Lejeune environmental officials said that they used water from the Hadnot Point water system because it was the only water system interconnected with the Holcomb Boulevard water system, and because they believed the water from the Hadnot Point water system was no longer contaminated. Prior to restarting the Holcomb Boulevard water system, samples of treated water were tested and no gasoline was detected in any of these samples. However, the samples were found to contain various levels of TCE; these results were attributed to the use of water from the Hadnot Point water system. About 5 days after these samples were taken, the Holcomb Boulevard water system was restarted because the fuel line had been repaired.

Following the discovery of contamination at individual wells in 1984, Camp Lejeune published articles in the base newspaper, provided one notification to residents of housing areas served by the Tarawa Terrace water system, and created a press release about issues related to drinking water at Camp Lejeune. In December 1984 the base newspaper published its first story about sampling efforts, detection of VOCs, and removal of wells from service in the Hadnot Point water system. At this time, Camp Lejeune environmental officials had not begun sampling all other wells on the base, including those at the Tarawa Terrace water system. Subsequently, in April 1985 the Commanding General of Camp Lejeune issued a notice to residents who lived in housing areas served by the Tarawa Terrace water system.[35] According to the notice:

> "Two of the wells that supply Tarawa Terrace have had to be taken off line because minute (trace) amounts of several organic chemicals have been detected in the water. There are no definitive State or Federal regulations regarding a safe level of these compounds, but as a precaution, I have ordered the closure of these wells for all but emergency situations when fire protection or domestic supply would be threatened."

The notice asked residents to reduce water use until early June, when the construction of a new water line was to be completed. In May 1985, another article in the base newspaper stated the number of wells that had been removed from service, stated why the wells were removed from service, and noted the potential for water shortage at Tarawa Terrace as a result. In addition, the Marine Corps provided us with copies of three North Carolina newspaper articles published from May 1985 to September

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[35] Documents do not indicate how this notice was provided to residents.

1985 discussing contamination at Camp Lejeune.[36] All three articles included information about the drinking water contamination and noted that 10 wells serving two water treatment systems at Camp Lejeune had been removed from service.

Past Contamination Was Estimated to Have Originated from Both On-base and Off-base Sources, and Cleanup Activities at These Sources Are Under Way

The sources of past contamination for the Hadnot Point water system have not been conclusively determined. However, DOD officials have estimated that eight contaminated on-base sites in the proximity of the Hadnot Point water system may be the sources of contamination for that water system. These eight sites were contaminated by leaking underground storage tanks containing fuel, by degreasing solvents, by hazardous chemical spills, and by other waste disposal practices.[37] Efforts by ATSDR are ongoing to conclusively determine the sources of past contamination in the Hadnot Point water system, as well as when the contamination began. For the Tarawa Terrace water system, North Carolina officials determined that the contamination likely came from a dry cleaning solvent that had been released into a leaking septic tank at an off-base dry cleaning facility—ABC One Hour Cleaners—which built its septic system and began operation in 1954. Both the dry cleaning facility and its septic tank were located off base but adjacent to a supply well for the Tarawa Terrace water system. Based on the environmental contamination at this site, ABC One Hour Cleaners was designated as a National Priorities List site in 1989. As part of its current health study, ATSDR has estimated that beginning as early as 1957 individuals were exposed to PCE in treated drinking water at levels equal to or greater than what became effective in 1992 as EPA's maximum contaminant level of 5 parts per billion.

Since 1989, officials from Camp Lejeune, North Carolina, and federal agencies, including EPA, have taken actions to clean up the suspected sources of the contamination in the Hadnot Point and Tarawa Terrace water systems. Because the contamination is thought to have come from both on- and off-base sources, and because those sources are part of two separate National Priorities List sites—Camp Lejeune and ABC One Hour

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[36] According to a May 1985 memorandum, Camp Lejeune officials issued a press release regarding removal of wells from service at Camp Lejeune in May 1985. However, the memorandum did not describe the contents of the press release, and the Marine Corps was unable to locate a copy of the press release for our review.

[37] The sources of contamination at these eight sites were identified through the NACIP program and the Installation Restoration Program, which replaced NACIP as the Navy and Marine Corps environmental program.

Cleaners—cleanup activities for the suspected sources of contamination are being managed separately. Cleanup activities have included the removal of contaminated soils and gasoline storage tanks and the treatment of contaminated groundwater and soils.

Although ATSDR Did Not Always Receive Requested Funding and Experienced Delays in Receiving Information from DOD, Officials Said Their Work Has Not Been Significantly Delayed

Since ATSDR began its Camp Lejeune-related work in 1991, the agency did not always receive requested funding and experienced delays in receiving information from DOD entities. Although concerns have been raised by former Camp Lejeune residents, ATSDR officials said these issues have not significantly delayed its work and that such situations are normal during the course of a study.

Funding of ATSDR's Camp Lejeune Work

ATSDR received funding from DOD for 13 of the 16 fiscal years during which it has conducted its Camp Lejeune-related work, and ATSDR provided its own funding for Camp Lejeune-related work during the other 3 years. Under federal law and in accordance with a memorandum of understanding between DOD and ATSDR, DOD is responsible for funding public health assessments and any follow-up public health activities, such as health studies or toxicological profiles related to DOD sites as agreed to in an annual plan of work. For fiscal year 1997, funding for ATSDR's Camp Lejeune-related work came from the Navy.

From fiscal year 1998 through fiscal year 2000, no funding was provided to ATSDR by the Navy or any DOD entity for its Camp Lejeune-related work because the agencies could not reach agreement about the funding for Camp Lejeune. In June 1997, ATSDR proposed conducting a study of childhood leukemia and birth defects associated with TCE and PCE exposure at Camp Lejeune during fiscal years 1998 and 1999 at an estimated cost of almost $1.8 million. In a July 1997 letter to the Navy, an ATSDR official noted that during a June meeting the Navy appeared to be reluctant to fund the proposed study; however, the official noted that DOD was liable for the costs of the study under federal law. In an October 1997 letter responding to ATSDR, a senior Navy official stated that the Navy did not believe it should be required to fund ATSDR's proposed study because the cause of the contamination was an off-base source, ABC One Hour Cleaners. The Navy official said that it was more appropriate for ATSDR to seek funding for the study from the responsible party that caused the contamination.[38] However, ATSDR officials told us that while they expected that the study would focus primarily on contamination from the dry cleaner, the study was also expected to include people who were exposed to on-base sources of contamination. An ATSDR official reported that the agency submitted its funding proposals for the Camp Lejeune study to DOD in each of the annual plans of work from fiscal year 1998 to fiscal year 2000, but that during that time period the agency received no DOD funding and funded its Camp Lejeune-related work from general ATSDR funding.

In fiscal year 2001 the Navy resumed funding of ATSDR's Camp Lejeune-related work. We could not determine why the Navy decided to resume funding of ATSDR's work at that time. Since fiscal year 2003, funding for ATSDR's Camp Lejeune-related work has been provided by the Marine Corps. According to a DOD official, the Marine Corps has committed to funding the current ATSDR study. The DOD official also noted that per a supplemental budget request from ATSDR for fiscal year 2006, the Marine Corps agreed to fund community assistance panel meetings and portions of a feasibility assessment for future studies that will include computerization of Camp Lejeune housing records.

Provision of Information to ATSDR by DOD

ATSDR has experienced some difficulties obtaining information from Camp Lejeune and DOD officials. For example, while conducting its public health assessment in September 1994, ATSDR sent a letter to the Department of the Navy noting that ATSDR had had difficulties getting documents needed for the public health assessment from Camp Lejeune, such as Remedial Investigation[39] documents for Camp Lejeune. The letter also noted that ATSDR had sent several requests for information, and Camp Lejeune's responses had been in most cases inadequate and no supporting documentation had been forwarded. ATSDR also had difficulty in obtaining access to DOD records while preparing to conduct its survey, the first phase of the current ATSDR health study. In October 1998, ATSDR requested assistance from the Defense Manpower Data Center, which maintains archives of DOD data, in locating residents of Camp Lejeune who gave birth between 1968 and 1985 on or off base. An official at the Defense Manpower Data Center initially did not provide the requested information because he believed that doing so could constitute a violation of the Privacy Act.[40] Between February and April 1999, Headquarters Marine Corps facilitated discussion between ATSDR and relevant DOD entities about these Privacy Act concerns and some information was subsequently provided to ATSDR by DOD. In April 2001, Headquarters Marine Corps sent a letter to the Defense Privacy Office suggesting that the Defense Manpower Data Center had only provided a limited amount of information to ATSDR.[41] However, in a July 2001 reply to Headquarters Marine Corps, the Defense Privacy Office noted that it believed that relevant data had been provided to ATSDR by the Defense Manpower Data Center in 1999 and 2001.

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[38] Additionally, the EPA Criminal Investigation Division, which conducted an investigation related to the drinking water contamination at Camp Lejeune, concluded that funding for the current study was apparently delayed because of opposition characterized as a professional difference of opinion as to the scientific value of the study by a midlevel manager at the Navy Environmental Health Center.

[39] A Remedial Investigation is performed at a site after it is listed on the National Priorities List. The Remedial Investigation serves as a mechanism for collecting data. Data collected during the Remedial Investigation influence the development of remedial alternatives for the site.

In December 2005, ATSDR officials told us that they had recently learned of a substantial number of additional documents that had not been previously provided to them by Camp Lejeune officials. ATSDR then sent a letter to Headquarters Marine Corps seeking assistance in resolving outstanding issues related to delays in the provision of information and data to ATSDR. In an attachment to the letter, ATSDR provided a list of data and information needed from the Marine Corps in order to complete water modeling activities for its current study. In a January 2006 response, a Headquarters Marine Corps official noted that a comprehensive review was conducted of responses to ATSDR's requests for information and that the Marine Corps believed it had made a full and timely disclosure of all known and available requested documents. The official also noted that while ATSDR had requested that the Marine Corps identify and provide documents that were relevant or useful to ATSDR's study, the Marine Corps did not always have the subject matter expertise to determine the relevance of documents. The official noted that the Marine Corps would attempt to comply with this request; however, the official also noted that ATSDR was the agency with the expertise necessary to determine the relevance of documents.

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[40] The Privacy Act of 1974 provides safeguards for individuals against invasions of privacy as a result of the collection of personal information by the federal government. Pub. L. No. 93-579, § 3, 88 Stat. 1896, 1897 (codified as amended at 5 U.S.C. § 552a).

[41] The Defense Privacy Office is responsible for implementation of DOD's Privacy Program, which regulates how and when DOD collects, maintains, uses, or disseminates personal information on individuals.

Effect on ATSDR's Work

Despite difficulties, ATSDR officials said the agency's Camp Lejeune-related work had not been significantly delayed or hindered by DOD. Officials said that while funding and access to records were probably slowed down and made more expensive by DOD officials' actions, their actions did not significantly impede ATSDR's health study efforts. The ATSDR officials also stated that while issues such as limitations in access to DOD data had to be addressed, such situations are normal during the course of a study. The officials stated that ATSDR's progress on the study has been reasonable in light of the complexity of the project. Nonetheless, as some former residents have learned that ATSDR has not always received requested funding and information from DOD entities, they have raised questions about DOD's commitment to supporting ATSDR's work.[42] For example, when some former residents learned during a community assistance panel meeting that it took about 4 months for DOD to respond to a supplemental budget request from ATSDR for fiscal year 2006, they questioned DOD entities' commitment to ATSDR's Camp Lejeune-related work. However, DOD and ATSDR officials described this delay in responding as typical during the funding process.

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[42] The Marine Corps has issued multiple public statements indicating support for ATSDR's work at Camp Lejeune.

Experts Convened by NAS Generally Agreed That Many Parameters of ATSDR's Current Study Were Appropriate

The seven members of an expert panel convened by NAS at our request generally agreed that specific parameters of ATSDR's current study were appropriate, including the study population, the exposure time frame, and the selected health effects. The expert panel members had mixed opinions on ATSDR's projected completion date.

Study Population

The seven panel experts concurred that ATSDR logically limited its study population to those individuals who were in utero while their mothers were pregnant and lived at Camp Lejeune during the 1968 through 1985 time frame, and who may have been exposed to the contaminated drinking water.[43] The current study follows recommendations from the agency's 1997 public health assessment of Camp Lejeune, which noted that studies of cancer among those who were exposed in utero should be conducted to further the understanding of the health effects in this susceptible population. Panel experts said that ideally a study would attempt to include all individuals who were potentially exposed, but that limited resources and data availability were practical reasons for limiting the study population. Additionally, panel experts agreed that those exposed while in utero were an appropriate study population because they could be considered at higher risk of adverse health outcomes than others, such as those exposed as children or adults. In addition, two panel experts said that studying only those who lived on base was reasonable because they likely had a higher risk of inhalation exposure to VOCs such as TCE and PCE, which may be more potent than ingestion exposure.[44] Thus, pregnant women who lived in areas of base housing with contaminated water and conducted activities during which they could inhale water vapor—such as bathing, showering, or washing dishes or clothing—likely faced greater exposure than those who did not live on base but worked on base in areas served by the contaminated drinking water.

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[43] ATSDR's current study population of those individuals who were in utero includes individuals whom ATSDR determined were exposed during specific time periods of the mother's pregnancy or after their birth to contaminated drinking water because they lived in an area that was served by the Hadnot Point or Tarawa Terrace water systems, and those that ATSDR determined through its study analysis were not exposed because they did not live in those areas or were not exposed during specific time periods.

[44] According to ATSDR, inhalation of TCE and PCE that have evaporated from drinking water is likely to result in higher exposures than ingestion. Additionally, 1991 EPA guidance on estimating exposure to VOCs during showering noted that scientific studies found that this exposure is approximately equivalent to exposure from ingesting two liters of the contaminated water per day.

Study Time Frame

The seven panel experts agreed that the 1968 through 1985 study time frame was reasonable, based on limitations in data availability. This time frame was adopted from ATSDR's 1998 study of adverse pregnancy outcomes, which limited the study population to include those potentially exposed between 1968 and 1985. According to ATSDR's study protocol, these years were chosen because 1968 was the first year that birth certificates were computerized in North Carolina and 1985 was when the affected water wells were removed from service. Four of the panel experts said they did not see any benefit in using an earlier start date than 1968 because collecting birth records before 1968 could require a significant amount of resources to collect data. In addition, while the initial exposure to contaminated drinking water may have occurred as early as the 1950s, at the time the ATSDR study time frame was selected officials were unable to determine precisely when the contamination began. Four of the panel experts commented that exposure was likely highest in the latter part of the study time frame—presumably, they said, as a result of a higher accumulated level of contamination over time—thus making the uncertainty of when the contamination began less significant and supporting ATSDR's decision to study the later time frame.

Study Health Effects

The five panel experts who discussed health effects said that those selected for the study were valid for individuals who were potentially exposed in utero at Camp Lejeune.[45] Based on previous ATSDR work and existing literature, the health effects chosen for the study were neural tube defects, oral cleft defects, and childhood hematopoietic cancers, including leukemia and non-Hodgkin's lymphoma.[46] Two panel experts said that

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[45] The two panel experts who did not discuss health effects said that this discussion was outside their areas of expertise. One expert is a professor of geochemistry and the second is an environmental engineer.

[46] An ATSDR document listing frequently asked questions about its health study states that the agency chose to study these birth defects and cancers based on the results of previous studies; two previous studies suggested that the chemicals in the drinking water at Camp Lejeune might cause these birth defects, while three studies suggested that these chemicals in drinking water might cause childhood leukemia. Additionally, ATSDR's study protocol noted that ATSDR's study could add to the body of scientific knowledge.

ATSDR had limited its study to health effects that are rare and that generally occur at higher levels of exposure to VOCs such as TCE and PCE than are expected to have occurred at Camp Lejeune. They said that this may result in ATSDR not identifying enough individuals with these health effects to determine meaningful results in the study.[47]

Study Completion Date

ATSDR has projected a December 2007 completion date for the study, which would include activities such as identifying and enrolling study participants, conducting a parental interview, confirming each reported diagnosis, modeling the water system to quantify the amount and extent of each individual's exposure, analyzing the data, and drafting a final report. Panel experts had mixed opinions regarding ATSDR's completion date. Of the five panel experts who commented on the proposed completion date, three said that the date appeared reasonable, and two others said that based on the complexity of the water modeling the projected completion date might be optimistic.[48]

Mr. Chairman, this completes my prepared statement. I would be happy to respond to any question you or other Members of the Subcommittee may have at this time.

Contacts and Acknowledgments

For further information about this testimony, please contact Marcia Crosse at (202) 512-7119 or crossem@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this testimony. Bonnie Anderson, Assistant Director; Karen Doran, Assistant Director; Danielle Organek; and Christina Ritchie made key contributions to this testimony.

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[47] ATSDR's public health assessment noted that the exposure levels experienced at Camp Lejeune were expected to be relatively low and experienced over a relatively short duration.

[48] One of the panel experts did not discuss the completion date of the study. A second expert said he did not have sufficient data to make a determination on whether the projected completion date was reasonable.

Appendix I: Volatile Organic Compounds Detected in Wells at Hadnot Point and Tarawa Terrace Water Systems

			Concentrations of chemicals in parts per billion[a]							
Water systems	Wells	Date removed from service	TCE[b]	PCE[c]	Benzene[d]	Trans-1,2-DCE[e]	1,1-DCE[f]	Methylene chloride[g]	Toluene[h]	Vinyl chloride[i]
Hadnot Point	602	Nov. 30, 1984	1,600	24	120	630	2.4	—	5.4	18
	601	Dec. 6, 1984	210	5	ND	88	ND	ND	ND	ND
	608	Dec. 6, 1984	110	ND	3.7	5.4	ND	ND	ND	ND
	634	Dec. 14, 1984	ND	ND	ND	2.3	—	130	—	ND
	637	Dec. 14, 1984	ND	ND	ND	ND	—	270	—	—
	651	Feb. 4, 1985	3,200	386	—	3,400	187	—	—	655
	652	Feb. 8, 1985	9	ND	—	ND	ND	—	—	ND
	653	Feb. 8, 1985	5.5	ND	—	ND	ND	—	—	ND
Tarawa Terrace	TT-26	Feb. 8, 1985	57	1,580	ND	92	—	—	—	27
	TT-23[j]	Feb. 8, 1985	ND	132	ND	11	—	—	—	ND

Source: GAO analysis of Headquarters Marine Corps data.

Notes: The detection limit for the instruments used to analyze the samples was 10 parts per billion. The detection limit is the lowest level at which the chemicals could be reliably identified by the instruments being used. A Marine Corps document providing the sampling results stated that ND meant "none detected." Where no concentration or ND is provided, the laboratory did not report results for these samples.

[a] The concentrations provided are those detected prior to each well's removal from service in 1984 and 1985 and are one-time sampling results. We did not find documentation that tied the decision to remove the wells from service to any particular level of contamination included in related Environmental Protection Agency (EPA) guidance or enforceable regulation.

[b] Trichloroethylene (TCE) is a volatile organic compound typically used as a metal degreaser.

[c] Tetrachloroethylene (PCE) is a volatile organic compound typically used as a dry cleaning solvent.

[d] Benzene is a widely used chemical formed from both natural processes and human activities. Some industries use benzene to make other chemicals which are used to make plastics, resins, and nylon and synthetic fibers. Benzene is also a natural part of crude oil, gasoline, and cigarette smoke. Breathing benzene can cause drowsiness, dizziness, and unconsciousness; long-term benzene exposure causes effects on the bone marrow and can cause anemia and leukemia. The Department of Health and Human Services (HHS) has determined that benzene is a known carcinogen.

[e] Trans-1,2-dichloroethylene (Trans-1,2-DCE) is an odorless organic liquid used as a solvent for waxes and resins; in the extraction of rubber; as a refrigerant; in the manufacture of pharmaceuticals and artificial pearls; in the extraction of oils and fats from fish and meat; and in making other organics. EPA has found trans-1,2-DCE to potentially cause central nervous system depression when people are exposed to it at levels above 100 parts per billion for relatively short periods of time. Trans-1,2-DCE has the potential to cause liver, circulatory, and nervous system damage from long-term exposure at levels above 100 parts per billion.

[f] 1,1-dichloroethylene (1,1-DCE) is an organic liquid with a mild, sweet, chloroform-like odor. Virtually all of it is used in making adhesives, synthetic fibers, refrigerants, food packaging, and coating resins. EPA has found 1,1-DCE to potentially cause liver damage when people are exposed to it at levels above 7 parts per billion for relatively short periods of time. In addition, 1,1-DCE has the potential to cause liver and kidney damage as well as toxicity to the developing fetus and cancer from a lifetime exposure at levels above 7 parts per billion.

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[g] Methylene chloride is a volatile organic compound used in various industrial processes, including paint stripping, paint remover manufacturing, and metal cleaning and degreasing. Breathing in large amounts of methylene chloride can damage the central nervous system. Contact of eyes or skin with methylene chloride can result in burns. HHS has determined that methylene chloride can be reasonably anticipated to be a cancer-causing chemical.

[h] Toluene is a clear, colorless liquid which occurs naturally in crude oil and in the tolu tree. It is also produced in the process of making gasoline and other fuels from crude oil and making coke from coal. Toluene may affect the nervous system. Low to moderate levels can cause tiredness, confusion, weakness, drunken-type actions, memory loss, nausea, loss of appetite, and hearing and color vision loss. Inhaling high levels of toluene in a short time can result in feelings of light-headedness, dizziness, or sleepiness. It can also cause unconsciousness, and even death. High levels of toluene may affect kidneys. Studies in humans and animals generally indicate that toluene does not cause cancer.

[i] Vinyl chloride is a colorless gas. It is a manufactured substance that does not occur naturally. It can be formed when other substances such as trichloroethane, TCE, and PCE are broken down. Breathing high levels of vinyl chloride for short periods of time can cause dizziness, sleepiness, and unconsciousness and at extremely high levels can cause death. Breathing vinyl chloride for long periods of time can result in permanent liver damage, immune reactions, nerve damage, and liver cancer. HHS has determined that vinyl chloride is a known carcinogen.

[j] Well TT-23 is also referred to as "TT-new well" in Marine Corps documents.

Mr. STUPAK. Thank you.

Mr. Hill, you opening statement, please?

STATEMENT OF FRANKLIN HILL, DIRECTOR, SUPERFUND DIVISION, U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 4

Mr. HILL. Mr. Chairman and members of the subcommittee, I am Franklin Hill, Director of the Superfund Division for the U.S. Environmental Protection Agency in region 4 in Atlanta.

The Superfund Division oversees cleanups of private and public property that is on the National Priorities List, a list of the country's most polluted sites. And we do that with a goal of protecting human health and the environment.

Currently, there are 165 private sites and 19 Federal sites on the NPL in region 4. I appreciate the opportunity to provide you with an overview of EPA's involvement in the Superfund cleanup activities at Camp Lejeune Military Reservation and Marine Corps Base. During the 18 years that EPA has been involved in cleanup at Camp Lejeune, we have made significant progress in cleaning up contaminated soil and groundwater. To date, we have selected remedies at 30 sites within Camp Lejeune and anticipate selection of the last remedy in the year of 2011. EPA region 4 received a letter dated April 25, 1986, from the Department of the Navy which provided sampling data from water samples taken from groundwater monitoring and drinking water wells at Camp Lejeune. The letter informed EPA that the Navy had shut down 10 drinking water wells at Camp Lejeune because 1985 sampling results showed contamination in those wells. The State of North Carolina, in a separate investigation, concluded that the likely source of contamination found in two of those wells was the ABC One-Hour Cleaners, a private business located outside the boundaries of Camp Lejeune. Subsequent investigations have revealed additional sources of groundwater contamination.

The ABC One-Hour Cleaners: the ABC Cleaners site is located at 2127 Lejeune Boulevard Jacksonville, Onslow County, NC and encompasses an area of approximately 1 acre. In 1984, as part of a routine water quality evaluation, the Navy collected groundwater samples and determined that volatile organic compounds, including dichloroethylene, trichloroethylene and tetrachloroethylene, were present in 10 of 40 well samples. Two of the 10 wells were located within the Camp Lejeune Tarawa Terrace well field in the vicinity of the ABC Cleaners.

In 1985, the Wilmington Regional Office of the Division of Environmental Management, North Carolina Department of Natural Resources and Community Development, conducted a groundwater pollution study to find the source of PCE in wells within the Tarawa Terrace well field. The study concluded that most likely the source of groundwater contamination was ABC Cleaners. The ABC One-Hour Cleaners was proposed to the National Priorities List by EPA on June 24, 1988, which became final on March 31, 1989.

A record of decision, as we refer to as a ROD, for contaminated groundwater was signed in 1993 and required remediation of VOC-contaminated groundwater by a treatment system. A second ROD was signed in 1994 to address soil contamination using soil vapor extraction. The SVE system has been operating since August 2000 to remove a source of groundwater contamination. ABC Cleaners site is a private Superfund lead site and is not part of the Camp Lejeune military base. However, contaminated groundwater from ABC Cleaners has migrated onto the base.

The responsible parties have been identified by EPA as the ABC Cleaners owners and operators. On July 17, 2000, EPA entered into an Administrative Order of Consent with ABC Cleaners and its owners and operators for settlement. The AOC required that, if settling parties ever receive payment on an insurance claim, then 50 percent of any insurance proceeds must be paid to EPA. At this time, the terms of the settlement have been completed, and there is no evidence that the parties collected insurance money.

Camp Lejeune: Under CERCLA, section 120, the EPA has evaluated releases at this Federal facility using its Hazard Ranking System criteria. The EPA conducted an initial investigation in 1988 and proposed Camp Lejeune for the NPL on June 24, 1988, which became final on October 4, 1989. The basis for the listing of Camp Lejeune on the NPL was pesticide-contaminated soil at an area on the base where pesticides were mixed and application equipment were cleaned.

Pursuant to CERCLA 120(e)(2), an interagency agreement, referred to as a Federal Facilities Agreement, was signed by EPA and the Navy and the State of North Carolina in February 1991. The FFA requires, among other things, that the facility prepare a Site Management Plan for EPA approval that identifies all of the sites and operating units that require further investigation and/or response action by the Navy. The Navy's Installation Restoration Program is responsible for implementation of the CERCLA cleanup under the FFA. The Site Management Plan also includes a list of enforceable milestones related to CERCLA that are enforceable by EPA.

Additional activities: 46 sites have been identified for cleanup at Camp Lejeune. The Navy and EPA have selected remedies for 30 of those sites, and the remaining 16 are under active investigation. The first ROD was signed in September 1992 and addressed contamination of groundwater in the Hadnot Point area. Remedies to address groundwater contamination include groundwater pump and treatment systems, in situ chemical oxidation, and monitoring natural attenuation. Six pilot studies are under way to evaluate treatment options for remaining VOC-contaminated groundwater areas at Camp Lejeune. EPA prepared 5-year review reports in November 1999 and February 2005, which evaluated the protectiveness of selected remedies. Below is a summary of the cleanup. Eleven pilot studies have been completed or are under way to evaluate remediation techniques for volatile organic compounds. Removal actions have been completed at two sites, which resulted in disposal of 696 tons of PCB-contaminated soil and source treatment of 7,500 cubic yards of dense nonaqueous phase liquids. A removal action is under way to treat VOC-contaminated groundwater of depths of 20 to 47 feet below ground surface. Two RODs were signed in 2006. One ROD required treatment of contaminated groundwater underneath a half acre of the base. This remedy is underway.

The other ROD determined that no action was necessary. One Operable Unit has met its remediation goals and achieved site closure. Three sites have undergone site investigations, with two requiring no further action, and the remaining site requiring a soil removal. At this point in time, Camp Lejeune is scheduled to have the last remedy selected by 2011 and all remedies in place by 2014.

In conclusion, in the 18 years since EPA listed Camp Lejeune on the NPL, 46 sites have been investigated. To date, there are 19 signed RODs, encompassing 30 sites at the Camp Lejeune base, which reflect a remedy selection rate greater than one ROD per year. The remaining 16 sites are undergoing active investigation. EPA anticipates that the last remedy will be in place by 2015. Thank you for this opportunity, and I am available to answer questions.

[The prepared statement of Mr. Hill follows:]

STATEMENT OF FRANKLIN HILL
DIRECTOR OF REGION 4 SUPERFUND DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS
COMMITTEE ON ENERGY AND COMMERCE
U.S. HOUSE OF REPRESENTATIVES

June 12, 2007

Introduction

Mr. Chairman and Members of the Subcommittee, I am Franklin Hill, Director of the Superfund Division for the U.S. Environmental Protection Agency Region 4 (EPA). The Superfund Division oversees implementation of the Superfund program in the eight states of the Southeast and seeks recovery of any federal funds expended in the clean up. The Superfund Division oversees clean ups of private and public property that is on the National Priorities List (NPL), a list of the country's most polluted sites. Currently there are 165 private sites and 19 federal sites on the NPL in Region 4.

I appreciate the opportunity to provide you with an overview of EPA's involvement in the Superfund clean up actions related to environmental contamination at the Camp Lejeune Military Reservation or Marine Corps Base Camp Lejeune (Camp Lejeune). During the 18 years that EPA has been involved in clean up at Camp Lejeune, we have made significant progress in cleaning up contaminated soil and groundwater. To date, we have selected remedies at 30 sites within Camp Lejeune, and anticipate selection of the last remedy by 2011.

EPA Region 4 received a letter dated April 25, 1986, from the Department of Navy (Navy), which provided sampling data from water samples taken from groundwater monitoring and drinking water wells at Camp Lejeune. The letter informed EPA that the Navy had shut down ten drinking water supply wells at Camp Lejeune because 1985 sampling results showed contamination in those wells. The State of North Carolina in a separate investigation concluded that the likely source of the contamination found in two of those wells was ABC One-Hour Cleaners (ABC Cleaners), a private business located outside the boundaries of Camp Lejeune. Subsequent investigations have revealed additional sources of groundwater contamination.

ABC One-Hour Cleaners

The ABC Cleaners site is located at 2127 Lejeune Boulevard, Jacksonville, Onslow County, North Carolina, and encompasses an area of approximately one acre. In 1984, as part of a routine water quality evaluation, the Navy collected groundwater samples and determined that volatile organic compounds (VOCs) including, dichloroethylene (DCE), trichloroethylene (TCE), and tetrachloroethylene (PCE) were present in 10 of the 40 wells sampled. Two of the ten wells were located within the Camp Lejeune Tarawa Terrace well field in the vicinity of the ABC Cleaners. In 1985, the Wilmington Regional Office of the Division of Environmental Management, North Carolina Department of Natural Resources and Community Development conducted a groundwater pollution study to define the source of PCE in wells within the Tarawa Terrace well field. The study concluded that the most likely source of groundwater contamination was ABC Cleaners. ABC One-Hour Cleaners was proposed for the National Priorities List (NPL) by EPA on June 24, 1988, which became final on March 31, 1989.

A Record of Decision (ROD) for contaminated groundwater was signed in 1993 and required remediation of VOC-contaminated groundwater by a treatment system. A second ROD was signed in 1994 to address soil contamination using a Soil Vapor Extraction (SVE) system. The SVE system has been operating since August 2000 to remove the source of the groundwater contamination.

ABC Cleaners site is a Private Superfund fund-lead site and is not part of Camp Lejeune; however contaminated groundwater from ABC Cleaners has migrated onto Camp Lejeune. The responsible parties have been identified by the EPA Cost Recovery Section as ABC Cleaners and their owners/operators. On July 17, 2000, EPA entered into an Administrative Order on Consent (AOC) with ABC Cleaners and its owners/operators for settlement. The AOC required that if the Settling parties ever receive payment on an insurance claim, then 50% of any insurance proceeds must be paid to the EPA. At this time, the terms of the settlement have been completed and there is no evidence that the parties collected insurance money.

Camp Lejeune

Under CERCLA Section 120, the EPA has evaluated releases at this federal facility using its Hazard Ranking System criteria. The EPA conducted an initial investigation in 1988 and proposed Camp Lejeune for the NPL on June 24, 1988, which became final on October 4, 1989. The basis for the listing of Camp Lejeune on the NPL was pesticide contaminated soils at an area on the Base where pesticides were mixed and application equipment cleaned. Pursuant to CERCLA 120(e)(2), an interagency agreement (referred to as a Federal Facilities Agreement or FFA) was signed by EPA, the Navy and the State of North Carolina in February 1991. The FFA requires, among other things, that the facility prepare a Site Management Plan (SMP) for EPA approval that identifies all of the sites and OUs that require further investigation and/or a response action by the Navy. The Navy's Installation Restoration Program is responsible for implementation of the CERCLA clean up under the FFA. The SMP also includes a list of enforceable milestones related to the CERCLA clean up that are enforceable by EPA.

Overview of Camp Lejeune Clean Up

Forty-six sites have been identified for clean up at Camp Lejeune. The Navy and EPA have selected remedies for 30 of those sites, and the remaining 16 are under active investigation. The first ROD was signed in September 1992 and addressed contamination of groundwater in the Hadnot Point Area. Remedies to address groundwater contamination include groundwater "pump and treat" systems, in-situ chemical oxidation, and monitored natural attenuation. Six pilot studies are underway to evaluate treatment options for the remaining VOC-contaminated groundwater areas at Camp Lejeune.

EPA prepared Five Year Review Reports in November 1999 and February 2005 which evaluated the protectiveness of the selected remedies. Below is a summary of the clean up actions conducted since the issuance of the February 2005 Five Year Review Report:

- Eleven Pilot Studies have been completed or are underway to evaluate remediation techniques for VOC-contaminated groundwater at various sites throughout the Base.
- Removal actions have been completed at two sites which resulted in disposal of 696 tons of PCB contaminated soils and source treatment of 7,500 yd^3 of dense non-aqueous phase liquid (DNAPL) containing PCE.
- A removal action is underway to treat VOC-contaminated groundwater at depths between 20 -to- 47 feet below ground surface.
- Two RODs were signed in 2006. One ROD required treatment of contaminated groundwater underneath a half-acre area of the base. This remedy is underway. The other ROD determined that no further action was necessary.
- One Operable Unit has met its remediation goals and achieved site closure.

- Three sites have undergone site investigations with two requiring no further action and the remaining site requiring a soil removal.

At this point in time Camp Lejeune is scheduled to have the last remedy selected by 2011 and all remedies in place by 2014.

Conclusion

In the 18 years since EPA listed Camp Lejeune on the NPL, 46 sites have been investigated. To date, there are 19 signed RODs encompassing 30 sites at Camp Lejeune, which reflects a remedy selection rate greater than one ROD per year. The remaining 16 sites are undergoing active investigation. EPA anticipates that the last remedy will be in place in 2014.

Mr. STUPAK. Thank you.

We will begin questioning. Mr. Hill, if I may start with you, you said you are going to finish in up by 2015?

Mr. HILL. Well, in the Site Management Plan, that is the schedule to address getting the remedies in place. Now what I will tell you is that those remedies will go on for years after 2015. Pump and treat is a complicated technology.

Mr. STUPAK. I am familiar with it.

Mr. HILL. And it takes quite some time to get there.

Mr. STUPAK. Camp Lejeune was listed in 1989. That was when it was final, you said. Here we are 18 years later, and nothing has been cleaned up; has it?

Mr. HILL. Well, we have a couple of sites that we have removed, or we have decided that they have reached their remedial goals. We have had some soil——

Mr. STUPAK. You are close?

Mr. HILL. We have had a number of cleanups on the site. So the answer to your question, sir, is yes, there have been some cleanups.

Mr. STUPAK. Of the 46 sites, how many have been cleaned up?

Mr. HILL. That is a good question. I don't want to guess at that, but I know that there are several removals that have been completed.

Mr. STUPAK. OK.

Mr. HILL. I can get you those specifics, but I don't have the specific numbers.

Mr. STUPAK. You won't even get to your last ROD, I think your testimony said, until, what, 2014?

Mr. HILL. Right.

Mr. STUPAK. Your Record of Decision; so that is 25 years after Camp Lejeune was named a Superfund site. What is causing the delay? Lack of money? Lack of resources? Why delay? Why 25 years?

Mr. HILL. Well, I think it is a combination of things. I think it is, resources, clearly, is one option or one issue.

Mr. STUPAK. Who should be providing the resources for this? EPA? DoD? Who should be providing the resources to clean up Camp Lejeune?

Mr. HILL. DoD should be providing those resources.

Mr. STUPAK. OK. Has DoD been forthcoming in bringing resources to the table to help clean up Camp Lejeune?

Mr. HILL. They have been. Of course, as all budgets, we are seeing those budgets start to diminish.

Mr. STUPAK. But the pollution at Camp Lejeune is not diminishing.

Mr. HILL. I would say that it is. Based upon some of the monitoring data, those numbers are going down.

Mr. STUPAK. Based upon migrating over somewhere else or where?

Mr. HILL. No. Actually, we have three pump and treat systems in place right now at the Hadnot Point area. And we can demonstrate from the monitoring data that those concentrations that were listed in the GAO report are now going down.

Mr. STUPAK. The part that bothers me a little bit, you mentioned ABC Cleaners, which is just on the outside of Camp Lejeune. The

ROD was what, 1989, and it was cleaned up in 1994? It took about 5 years to do that. That is on an acre. And that was the contamination that drifted over to Tarawa Terrace. How come you got that one cleaned up in like 5 years, and yet we are 25 years and not even getting cleaned up?

Mr. HILL. Chairman, let me correct you. First of all, ABC Cleaners is not cleaned up. We have a remedy in place, and it is construction complete. We have built a groundwater pump and treat system, and we have an SVE system addressing soils on-site.

Mr. STUPAK. So it is still going?

Mr. HILL. It is still going.

Mr. STUPAK. So the ROD was 5 years.

Mr. HILL. Right.

Mr. STUPAK. And your last ROD still isn't done for Camp Lejeune. So there is a pumping station. How long will that go on, that pumping station at ABC Cleaners?

Mr. HILL. It will go on until we achieve the remedial goals for that site. And right now, we are looking at North Carolina standards, which is about 2.8 parts per billion for TCE. So that is quite a conservative number. And it will take us some time to achieve that.

Mr. STUPAK. OK. Thank you.

Mr. Amon, were you here for the first panel testifying? Were you in the room?

Mr. AMON. Sir, I believe I walked in towards the end of that testimony.

Mr. STUPAK. All right. Are you familiar with Mr. Ensminger?

Mr. AMON. I am.

Mr. STUPAK. OK. In his written testimony, he states you told him you recommended criminal charges against certain subjects. That was part of your investigation. Is that correct?

Mr. AMON. That is not correct.

Mr. STUPAK. OK. You didn't make any recommendations?

Mr. AMON. I just collect the facts, the evidence, and present that to my supervisors, and then, in this case, the Department of Justice, for consideration.

Mr. STUPAK. OK. Do you present that in writing or orally?

Mr. AMON. Both.

Mr. STUPAK. OK. And you made no recommendations of any charges?

Mr. AMON. That is correct.

Mr. STUPAK. OK. And why did you recommend no criminal charges?

Mr. AMON. In this matter, based upon the evidence in all forms that I was able to review, I presented that to the Department of Justice, I presented that to my supervisors, and based upon that analysis, a determination was made that the statute did not call for Federal charges. And I concurred with that analysis.

Mr. STUPAK. OK. I realize, and testimony has been clear, that Justice Department decided not to prosecute because of a lack of EPA standards on TCE and PCE in drinking water in the early 1980's. But given the report that we reviewed, and I believe it is your report, that the evidence of witness coaching and witnesses not being forthcoming, shouldn't you have at least thought about obstruction of justice charges?

Mr. AMON. And those charges were considered.

Mr. STUPAK. So criminal charges were considered on obstructing justice?

Mr. AMON. That is correct, sir.

Mr. STUPAK. OK. And then who determined not to bring forth the charges?

Mr. AMON. The Department of Justice ultimately makes decisions on what is charged.

Mr. STUPAK. Did you recommend that there would be obstruction of justice charges brought forth? Did you recommend?

Mr. AMON. Did I personally, Tyler Amon?

Mr. STUPAK. Yes.

Mr. AMON. In this matter, specifically as it pertains to the obstruction charges that you are indicating from, I believe, a report that I generated during the course of this case, I concurred with the Department of Justice's decision not to proceed with charges.

Mr. STUPAK. OK. But I am trying to ask you, did you recommend that obstruction charges be brought? Obstruction of justice charges.

Mr. AMON. As a field agent, recommend is an action that is not——

Mr. STUPAK. OK. When you do your investigation, you send it to the prosecutor for action; right?

Mr. AMON. That is correct.

Mr. STUPAK. And you indicated you submitted that written and orally; correct?

Mr. AMON. That is correct.

Mr. STUPAK. So, in your oral discussions with Justice Department, did you ask for, did you seek obstruction of justice charges?

Mr. AMON. In my report, which would be written, I do identify areas of concern related to obstruction of justice; that is correct.

Mr. STUPAK. Correct. OK. So did you ask for a warrant? Let me put it bluntly.

Mr. AMON. No, I did not.

Mr. STUPAK. OK. How about the doctor who destroyed the records as to the telephone logs? Did you ask for obstruction of justice there?

Mr. AMON. I am sorry, refresh my memory.

Mr. STUPAK. Page 56 of your report, if you have it there in front of you, unredacted report. You must have it with you there; right? It is on page 56.

Mr. AMON. That is correct. I see that here. Could you repeat the question, please?

Mr. STUPAK. Sure. And if you go down there, that report, about third paragraph says, while it is not clear blank gave a direct order to destroy the records, it is clear that blank fully expected and specifically advised blank not to take any Camp Lejeune records from the Division of Health Studies. And you go down that those records never made it to the records, and they were destroyed. Did you recommend obstruction of justice charges there?

Mr. AMON. Sir, in regard to the ATSDR records, those records actually never were destroyed.

Mr. STUPAK. OK. Not the ATSDR, but the individual's notes. And those notes are important because it identifies names, numbers and medical information that this individual had conducted over a year in their capacity. And those personal records were destroyed; not ATSDR, but those personal records, which would be useful, as you indicate, in this investigation.

Mr. AMON. Sir, the records that you speak of that pertain to a doctor who was involved in the Camp Lejeune matter on behalf of ATSDR, had records that were kept in the course of that doctor's work at ATSDR. But I think, fairly, as you are indicating, they were records that were taken in booklets and whatnot that that doctor retained. I actually seized those records from that doctor and retained those in evidence in the criminal investigations file in Charlotte, North Carolina, until the conclusion of this case.

Mr. STUPAK. OK. Where are they now then?

Mr. AMON. They are now at ATSDR.

Mr. STUPAK. OK. You indicate in your criminal investigation that the biggest area of concern were the seemingly rehearsed statements provided by personnel at LANTDIV. That is on page 29. And you go on to page 30, greatest concern lay in the fact that investigators found LANTDIV personnel—that's Naval Facilities Engineering Command personnel—to have been coached. Is that true?

Mr. AMON. That is correct.

Mr. STUPAK. And there were no violations of any laws there, obstruction of justice, there in all the coaching?

Mr. AMON. Again, I provided those to the Department of Justice in my hierarchy for consideration. Those statements, those statements you see there in the report were a summary of what the evidence in this case, referring to both documentary and testimony evidence, that I was able to review. And based upon that, I wrote how I saw it.

Mr. STUPAK. Mr. Whitfield for questions.

Mr. WHITFIELD. Thank you, Mr. Chairman.

Mr. Murtha referred to a letter that he wrote to Mr. Dingell regarding this hearing. And if there is not any objection, we would just like to enter that into the record. I think you all have a copy of it as well.

Mr. STUPAK. Without objection, the letter of June 11, 2007, is entered in the record. And we should enter in the record my response is, Mr. Amon will be here and will testify.

Mr. WHITFIELD. Great. Thank you. Now, Mr. Hill, ABC Cleaners, that was one of the primary sources of this contamination. Who was the owner of ABC Cleaners?

Mr. HILL. I don't have the name. I just have a reference to the owner and operators.

Mr. WHITFIELD. But, at that time, there was not any criminal activity or any criminal charges that could be brought against ABC Cleaners?

Mr. HILL. No, sir.

Mr. WHITFIELD. Because there were no laws on the books relating to contaminating groundwater and so forth?

Mr. HILL. I wouldn't say that there were no laws on the books, that if there was criminal activity.

Mr. WHITFIELD. It was probably negligent activity.

Mr. HILL. I would possibly agree with that. But it was never investigated as a criminal act.

Mr. WHITFIELD. So it was never investigated as a criminal act. Now, do you have any idea of what the dollar cost will be for the cleanup of Camp Lejeune, the total cleanup?

Mr. HILL. I don't. And we were trying to get to some final dollar figures. We have estimated that we have already spent upwards of $100 million, but I don't have the detailed dollar amounts.

Mr. WHITFIELD. $100 million has already been spent?

Mr. HILL. That is an estimate on my part, just based upon some discussions I had this morning. We would have to talk to DoD to get those figures.

Mr. WHITFIELD. And since there hasn't been very much of a cleanup, I am assuming that we can multiply that by a relatively large number.

Mr. HILL. Well, again, we make reference that there has not been much of a cleanup. I just want to go back and reassure you that there has been a tremendous amount of work.

Mr. WHITFIELD. OK.

Mr. HILL. A lot of aggressive soil surface excavation work has been done. Groundwater pump and treatment systems are in place. Treatability studies in the field. So a lot of work has been done here.

Mr. WHITFIELD. But the ultimate costs, would it be equal to a billion dollars? Would you say that is possible?

Mr. HILL. I would hate to speculate on the costs, but I can get back with you on an estimate.

Mr. WHITFIELD. OK. Of course, the dollar cost is very small considering the health costs that have been incurred and the deaths that have been incurred. But ultimately the taxpayers will be paying for this. Is that correct?

Mr. HILL. Yes.

Mr. WHITFIELD. You did indicate that you had reached an agreement or a settlement with ABC Cleaners. But I assume the only dollar amount you would get from them was from the insurance policy, and they never received any compensation. Is that correct?

Mr. HILL. We actually have an ability-to-pay process where we looked at the owners and operators' capability to pay, and there was an amount that they were able to pay. And they came forward with that amount.

Mr. WHITFIELD. They did?

Mr. HILL. Yes.

Mr. WHITFIELD. So they did pay something?

Mr. HILL. They did pay something.

Mr. WHITFIELD. And they are no longer in business?

Mr. HILL. The individuals at that time I am not sure are still operating the business, but it is my understanding that it is now still a drop-off cleaners operation.

Mr. WHITFIELD. Oh, it is? OK.

Mr. Amon, do you work for the Department of Justice or EPA?

Mr. AMON. I work for the Environmental Protection Agency.

Mr. WHITFIELD. And you report to Mr. Murtha?

Mr. AMON. Through a series of a hierarchy, yes.

Mr. WHITFIELD. OK. But when you do criminal investigations for EPA, the Department of Justice, they actually bring any charges through their U.S. Attorneys if there are charges. Is that correct? Or do you all have the authority to bring charges as well?

Mr. MURTHA. No, sir, we work through the Department of Justice, both the U.S. Attorney's Offices and the Environmental Crimes Section of main Justice. Both were involved in this particular investigation.

Mr. WHITFIELD. I know that—I am sure, Mr. Murtha, that you and Mr. Amon both sat in with the Department of Justice when you were considering the criminal charges in this case. And I am not defending Mr. Libby at all, Vice President Cheney's chief of staff who is now in prison for divulging—he is not in prison yet. He has been convicted. He has been sentenced. But for divulging the name of an undercover agent. And in this instance, we have many people who have died. We have had many people who have suffered significant health problems. We have huge environmental costs involving cleanup. And some of the phrases used regarding the Navy Engineering's testimony and how they were not forthcoming, how they had been coached, how they seemed to be concealing, and it seems sort of puzzling that there were not some sort of obstruction of justice charges levied in that case.

Mr. MURTHA. Sir, if I may respond to that?

Mr. WHITFIELD. Yes.

Mr. MURTHA. I was not in fact involved in any of the discussions concerning whether or not charges would be brought in this case. I felt a lot of comfort in knowing that both the U.S. Attorney's Office and Environmental Crimes Section had assigned very experienced and talented prosecutors to this case to work along with Special Agent Amon. And I really felt that a very strong team had been put together in that connection and that they would be closest to the evidence and would be in the best position to assess whether or not charges would be advisable.

I think one also has to bear in mind, although clearly there is some derogatory information in the investigation that we put together, that it is really a higher bar to bring criminal charges. Under the principles of Federal prosecution, the Department of Justice prosecutors need to make sure that they have a reasonable probability of succeeding on the charges that they bring. And I think the feeling must have been here that, even though there was evidence of not being forthcoming, that that evidence didn't quite reach the level where there could be a reasonable probability that convictions would be obtained.

Mr. WHITFIELD. OK. Thank you.

Ms. Crosse, the GAO spent a lot of time investigating this drinking water contamination at Camp Lejeune. And I would ask you, we know that there are some other military bases with similar problems, and would you have any recommendations on how the committee should proceed with a review of contamination at other military bases?

Ms. CROSSE. Sir, I'm not familiar with the circumstances of contamination at other installations. We were mandated by Congress in the Defense Authorization Act to undertake this review. I just don't have information to know about the level of documentation or the kinds of circumstances involved. Certainly GAO is available to review cases, individual cases, or to take a broader look at environmental contamination on military installations around the country.

Mr. WHITFIELD. OK.

Mr. Chairman, I don't have any other questions.

Mr. STUPAK. Just a few, if I may.

Mr. Hill, where's the water source now for Camp Lejeune? Are they getting it from nearby cities? Have they drilled other wells?

Mr. HILL. They're getting it from the Castle Hayne aquifer on the base.

Mr. STUPAK. Still wells then?

Mr. HILL. Yes.

Mr. STUPAK. Are you monitoring at all to see if there's going to be migration of these contaminants into the other wells on the base?

Mr. HILL. We do have monitoring wells throughout the base, and also the Drinking Water Program is monitoring the distribution of the drinking water for Camp Lejeune.

Mr. STUPAK. OK. Thanks.

Mr. Amon, if I may, Mr. Whitfield asked some good questions about, whatever happened or why weren't obstruction of justice charges brought forth on this? When you did your report, who would you have had to have briefed within your own agency at EPA then in seeking these charges? Who would you brief?

Mr. AMON. The special agent in charge. In this case that would have been the SAC in Atlanta, Georgia, that has coverage over multiple States, including North Carolina.

Mr. STUPAK. So that's special agent in charge or something?

Mr. AMON. That's correct.

Mr. STUPAK. Who would that be?

Mr. AMON. Fred Burnside.

Mr. STUPAK. OK. Did you ever deal directly with Department of Justice then? U.S. attorney?

Mr. AMON. I did.

Mr. STUPAK. Who did you deal with there?

Mr. AMON. I dealt primarily with two line prosecutors. In this case, there was one assigned by the United States Attorney's Office in Raleigh, NC, which falls in the eastern district of North Carolina. And the second was, as the director referenced before, main Justice has a Special Environmental Section. In that case, that was a trial attorney named Stacey Mitchell.

Mr. STUPAK. OK. Who was the gentleman out of North Carolina?

Mr. AMON. Banu Rangarajan. She is female

Mr. STUPAK. OK. Anything else? Nothing further for this panel. You are dismissed. Thank you again.

Mr. Whitfield, without objection, I would like to put the full binder into the record, and your June 11 record is also in there, that one document. No objections.

The record will remain open for 30 days for further statements, opening statements of members or any other documents which the committee has requested. If people would get them into us, they will be made part of the record. That concludes all of our questions. We will dismiss this panel, and that concludes our hearing.

Without objection, this subcommittee meeting is adjourned. Thank you all.

[Whereupon, at 2:01 p.m., the subcommittee was adjourned.]

[Material submitted for inclusion in the record follows:]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

AUG 15 2007

The Honorable Gene Green
U.S. House of Representatives
316 Ford House Office Building
Washington, D.C. 20515

Dear Congressman Green:

Thank you for your request for additional information following the June 12, 2007, hearing before the Subcommittee on Oversight and Investigations on contaminated drinking water at Camp Lejeune. I hope this information will be useful to you and the Members of the Subcommittee.

If you have any questions or need additional information, please contact me or the EPA Region 4 Office of Congressional and Intergovernmental Relations at (404) 562-8327.

Sincerely,

J. I. Palmer, Jr.
Regional Administrator

cc: Chairman John D. Dingell

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EPA Response to Questions for the Record

House Energy and Commerce Committee
Subcommittee on Oversight and Investigations

June 12, 2007 Hearing on Drinking Water Contamination at Camp Lejeune

1. Mr. Hill, what is average length of time to clean up a Superfund site?

The durations of hazardous substance site cleanups vary widely. Generally, sites owned or operated by the federal government require a longer time for remediation than non-federal sites because federal facility cleanups, on average, are more complex and contain a wider range of contaminants. Differences in the size and characteristics of a site and/or the nature of contamination can significantly prolong cleanups. Sites with simple contamination problems are among the cases of fast cleanups. In Region 4, there are 210 sites listed on the National Priorities List (NPL) of which 19 are federal facilities. There have been 45 non-federal sites deleted from the NPL. The average time of remediation at these sites is 11.4 years from NPL listing to deletion, with a range from 2.3 years to 23 years.

2. In your testimony, you indicate that Camp Lejeune was placed on the National Priorities List in 1991 and that final remediation is expected to occur in 2014. That would indicate to me that clean up of this site, if completed on time, will have taken 23 years to complete. Why has it taken so long to clean up the contamination in and around Camp Lejeune?

EPA projects that all the remedial systems will be in place and operational by 2014; however, that is not the date that cleanup will be achieved. Of the 46 sites related to Camp Lejeune, 28 sites have reached a no further action status by meeting their remediation goals. The remaining contaminated Camp Lejeune sites have been divided into 22 Operable Units (OU). Due to the logistical and resource constraints of investigating 22 OUs, schedules have been developed to prioritize the remediation effort to meet the long term cleanup goals. Final cleanup will not be recorded until the last OU has reached its cleanup goals.

There are several OUs with extensive groundwater contamination that require a longer remediation period. As groundwater is a predominant source of drinking water for many North Carolinians, we place a high premium on ensuring proper remediation. Pump and treat remedies are typically calculated using a standard 30-year timeframe. Additionally, site conditions in this area make groundwater cleanup a slow and difficult process and may take as long as 60 years. Although groundwater cleanup has not been achieved, remediation efforts have resulted in significant decreases in contaminant concentrations in many wells at Camp Lejeune and at a nearby Superfund site, ABC Cleaners. Currently, efforts are underway at Camp Lejeune to evaluate alternative treatment technologies to further decrease the time required to reach the remediation goals.

3. Has the clean-up process been prolonged by the joint agreement between the Environmental Protection Agency, the Navy, and the State of North Carolina?

No. Since the EPA, State, and Navy have a good working relationship, the joint partnership has resulted in an expedited schedule to reach final site cleanup.

At Camp Lejeune, the length of the cleanup process results primarily from the specific site conditions and the limitations of the available technologies to treat groundwater contamination. To date, 19 Records of Decision (ROD) have been signed, which equates to 30 sites, and reflects remedy selection at a rate of greater than one ROD per year. The remaining 16 sites are undergoing active investigations. Removal actions are also being utilized to reduce the contaminant mass during the investigation process, which will also decrease the timeframe to reach the cleanup goals.

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June 6, 2007

Dr. Howard Frumpkin
Director
Agency for Toxic Substances and Disease Registry
1825 Century Blvd.
Atlanta, GA 30345

Dear Dr. Frumpkin:

The Committee staff of the House Energy and Commerce Committee recently met with officials of the Agency for Toxic Substances and Disease Registry (ATSDR) to review ATSDR's ongoing public health assessment of possible health impacts related to historical exposures to trichloroethylene (TCE) and other volatile organic compounds from contaminated drinking water at U.S. Marine Corps Base Camp Lejeune, North Carolina (Camp Lejeune). We are writing to obtain information regarding apparent historical exposures of military personnel to TCE and volatile organic compounds in drinking water at military facilities other than Camp Lejeune with observed TCE contamination.

At Camp Lejeune, TCE and other volatile organic compounds were discovered in finished drinking water and in groundwater wells used as a source of drinking water at the site in the early-mid 1980s. In 1985, military officials immediately closed 10 specific groundwater wells used as a source of drinking water upon discovering the wells were contaminated with high levels of TCE and other volatile organic compounds. Concentrations of TCE were detected as high as 1,400 parts per billion (ppb). The Environmental Protection Agency promulgated a 5 ppb drinking water standard for TCE in 1989. ATSDR is in the process of completing an extensive multi-year public health assessment that will calculate TCE and other volatile organic compound exposures to residents at Camp Lejeune, and review possible links between birth defects and exposure to TCE and other volatile organic compounds.

As part of our review of TCE and volatile organic compound contamination at Camp Lejeune, Committee Minority staff reviewed over 7,000 records that document TCE contamination of groundwater and tap water at various military and civilian facilities across the United States. This information was obtained from the ATSDR's publicly available HazDat database. Using the information available in HazDat, the attached list (Attachment A) identifies military bases with TCE contamination of both finished tap water and groundwater used as a source of municipal/public drinking water. In some cases, the extent of TCE contamination is similar to or far in excess of what was observed at Camp Lejeune. For instance, at the Wurtsmith Air Force Base, TCE concentrations were as high as 1,100 ppb in tap water, and source groundwater used as a source of drinking water at the site had concentrations as high as 5,173 ppb. As another example, source groundwater used as a source of drinking water at the Nebraska Ordnance Plant had TCE concentrations as high as 663,000 ppb.

In many cases, facility-specific data in the HazDat database is incomplete or missing important information with respect to the levels of TCE observed, the source of the tested water (tap water, groundwater, or municipal groundwater), or the location of the sampled water (onsite or offsite). Furthermore, where more complete data is available, the HazDat data indicates that source groundwater or tap water was at one time contaminated with TCE. However, the data does not indicate whether individuals were in fact exposed to contaminated drinking water, the degree of any exposure, or the duration of any exposure.

Based on the limitations of the HazDat data, we are concerned that we do not have a complete understanding of historical TCE and volatile organic compound contamination and exposures from drinking water at these facilities. Many of these facilities are Superfund sites, so it is likely that ATSDR has completed a health assessment at many facilities that will provide information on current exposures at these sites.

To obtain a better understanding of these matters, and specifically to obtain available information on historical exposures at these sites, we ask that you respond in writing to the attached list of questions (Attachment B). As you know, the Subcommittee on Oversight and Investigations is planning a June 12, 2007, hearing to review Camp Lejeune drinking water contamination. I ask that you provide an interim response to these questions by June 11, 2007, and a complete response by June 25, 2007.

Thank you in advance for your cooperation in this important matter. If you have any questions, please contact us or have your staff contact Dwight Cates of the Minority Committee Staff at (202)225-3541.

Sincerely,

Joe Barton
Joe Barton
Ranking Member

Ed Whitfield
Ed Whitfield
Ranking Member
Subcommittee on Oversight
and Investigations

Attachment A

Defense Facilities with TCE Contamination in Groundwater used for Municipal/Public Drinking Water.

AIR FORCE PLANT #4 (GENERAL DYNAMICS) TX7572024605 Groundwater, Public/Municipal 11000 micrograms/Liter (ug/L)

ANDERSEN AIR FORCE BASE GU6571999519 Groundwater, Public/Municipal 39parts per billion (ppb)

BARSTOW MARINE CORPS LOGISTICS BASE CA8170024261 Groundwater, Public/Municipal 25parts per billion (ppb)

CORNHUSKER ARMY AMMUNITION PLANT NE2213820234 Groundwater, Public/Municipal 32.1parts per billion (ppb)

FAIRCHILD AIR FORCE BASE (4 WASTE AREAS) WA9571924647 Groundwater, Public/Municipal 80parts per billion (ppb)

LAKE CITY ARMY AMMUNITION PLANT MO3213890012 Groundwater, Public/Municipal 52parts per billion (ppb)

MARCH AIR FORCE BASE CA4570024527 Groundwater, Public/Municipal 66 micrograms/Liter (ug/L)

MATHER AIR FORCE BASE CA8570024143 Groundwater, Public/Municipal 800 parts per billion (ppb)

MCCHORD AIR FORCE BASE WA8570024200 Groundwater, Public/Municipal 20 parts per billion (ppb)

MCCLELLAN AIR FORCE BASE CA4570024337 Groundwater, Public/Municipal 2000 micrograms/Liter (ug/L)

MIDDLETOWN AIR FIELD PAD980538763 Groundwater, Public/Municipal 311 micrograms/Liter (ug/L)

NAVAL AIR DEVELOPMENT CENTER PA6170024545 Groundwater, Public/Municipal 293 parts per billion (ppb)

NAVAL WEAPONS INDUSTRIAL RESERVE PLANT MA6170023570 Groundwater, Public/Municipal 33 parts per billion (ppb)

NEBRASKA ORDNANCE PLANT NE6211890011 Groundwater, Public/Municipal 663000.00000 parts per billion (ppb)

NORTON AIR FORCE BASE CA4570024345 Groundwater, Public/Municipal 17 parts per billion (ppb)

OLD ROOSEVELT FIELD NYSFN0204234 Groundwater, Public/Municipal 170 micrograms/Liter (ug/L)

OTIS AIR NATIONAL GUARD BASE/CAMP EDWARD MA2570024487 Groundwater, Public/Municipal 9.80 micrograms/Liter (ug/L)

PICATINNY ARSENAL NJ3210020704 Groundwater, Public/Municipal 260 parts per billion (ppb)

PEASE AIR FORCE BASE NH7570024847 Groundwater, Public/Municipal 391 micrograms/Liter (ug/L)

WHITING FIELD NAVAL AIR STATION FL2170023244 Groundwater, Public/Municipal 10.5 parts per billion (ppb)

WURTSMITH AIR FORCE BASE MI5570024278 Groundwater, Public/Municipal 5173 parts per billion (ppb)

Defense facilities with TCE contaminated Tap Water

NEW BRIGHTON/ARDEN HILLS/TCAAP (USARMY) MN7213820908 Tap Water 150 micrograms/Liter (ug/L)

WURTSMITH AIR FORCE BASE MI5570024278 Tap Water 1100 parts per billion (ppb)

Attachment B

1. For each facility on the attached list, please describe what public health activities the Agency for Toxic Substances and Disease Registry (ATSDR) has conducted, and the results of those activities. Please provide information specific to trichloroethylene (TCE) and volatile organic compound contamination, exposures, and historical exposures. Please include an explanation of when the TCE contamination was discovered, whether/when other volatile organic compounds of public health significance were discovered, whether exposures were likely to have occurred, and whether/when such exposures were stopped.
2. Please provide the same information requested in question #1 for any military facility missing from the attached list that ATSDR is aware had TCE or volatile organic compound contamination in tap water or groundwater used as a source of drinking water.
3. Please explain why the data for several military facilities in the HazDat database have incomplete or missing information, and what ATSDR is doing to obtain that missing information, and any steps ATSDR is taking to ensure more complete information in the HazDat database.

6/11/07 Preliminary Information in Response to 6/6/07 Letter Requesting Information re:
Department of Defense Sites with Private or Municipal Well Water Contamination (Specifically, Tetrachloroethylene and Trichloroethylene Contamination)

Site Name	Contaminant	Maximum Level	Private Well/ Municipal Wells	Estimated Exposed Population	Estimated Exposed Population
American Lake Gardens (U.S. Air Force)	PCE[1] TCE[2]	Not Reported 41 ppb[3] 4.5 ppb	Not Reported Private Wells Municipal Wells	3,000 – 10,000	No time-lines provided. Restoration began in 1985, and public water had been provided by that time.
Camp Lejeune (Marine Corps)	PCE TCE	215 ppb 1,400 ppb	Municipal Wells Municipal Wells	Up to 1,000,000 (about 85,000 at Tarawa Terrace)	29 years
Defense General Supply Center (Defense Logistics)	PCE TCE	4.9 ppb 5.2 ppb	Private Wells Private Wells	84	No estimate. Center opened in 1942. Contamination found and alternate supply offered in 1987.
Ellsworth Air Force Base	PCE TCE	Not Reported 24.5 ppb	Not Reported Private Wells	6	10 years maximum
Fort Lewis (U.S. Army)	PCE TCE	6 ppb 41 ppb	Private Wells Private Wells	20	No estimate. Post opened in 1917. Contamination was found in 1985, and alternative water was made available in 1985.
Fort Riley (U.S. Army)	PCE TCE	330 ppb 96 ppb	Private Wells Private Wells	2,550	No estimate. Wells on-line in 1928, 1943, and 1958 with oldest ones replaced in 1993 and signs posted at off-site well in 1993. Contamination found in 1981.
Griffiss Air Force Base	PCE TCE	6.9 ppb Not Reported	Private Wells Not Reported	95	No estimate. Base operated from 1942—1995. Contamination (low levels) was found in 1982 and continued until 1989 (7 years known exposure, years prior to 1982 unknown).

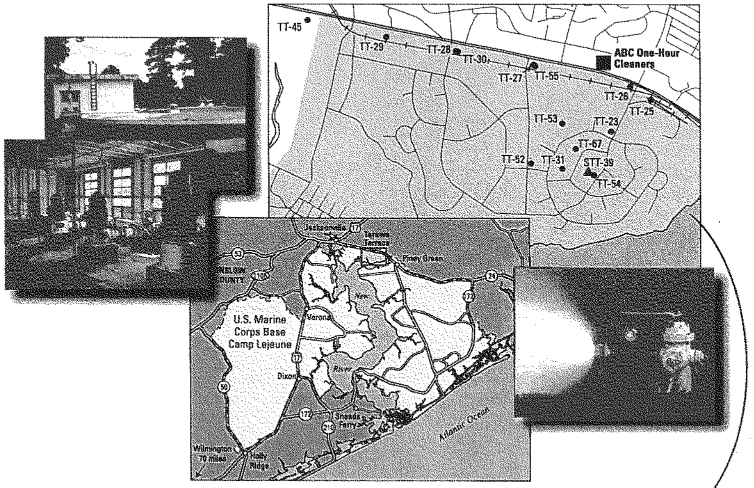
Table continued from page 1

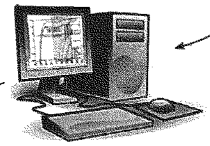
Site Name	Contaminant	Maximum Level	Private Well/ Municipal Wells	Estimated Exposed Population	Estimated Exposed Population
McClellan Air Force Base	PCE TCE	4 ppb 55 ppb	Private Wells Private Wells	16,540	No estimate. Base opened in 1938. Contamination found in 1979. Most homes put on public water by 1986.
Rocky Mountain Arsenal (U.S. Army)	PCE TCE	14.7 ppb Not Reported	Private Wells Not Reported	30,207	No estimate, but likely less than 5 years. Sampling began in 1985 and contamination was first found in 1990. Bottled water was offered in 1990.

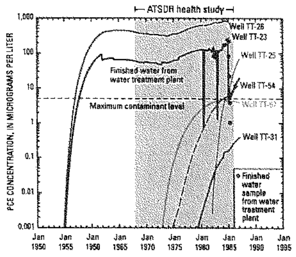
[1] PCE = Tetrachloroethylene
[2] TCE = Trichloroethylene
[3] ppb = parts per billion

Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions

Executive Summary







ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

Atlanta, Georgia–June 2007

Foreword

The Agency for Toxic Substances and Disease Registry (ATSDR), an agency of the U.S. Department of Health and Human Services, is conducting an epidemiological study to evaluate whether in utero and infant (up to 1 year of age) exposures to volatile organic compounds in contaminated drinking water at U.S. Marine Corps Base Camp Lejeune, North Carolina, were associated with specific birth defects and childhood cancers. The study includes births occurring during the period 1968–1985 to women who were pregnant while they resided in family housing at the base. During 2004, the study protocol received approval from the Centers for Disease Control and Prevention Institutional Review Board and the U.S. Office of Management and Budget.

Historical exposure data needed for the epidemiological case-control study are limited. To obtain estimates of historical exposure, ATSDR is using water-modeling techniques and the process of historical reconstruction. These methods are used to quantify concentrations of particular contaminants in finished water and to compute the level and duration of human exposure to contaminated drinking water.

Final interpretive results for Tarawa Terrace and vicinity—based on information gathering, data interpretations, and water-modeling analyses—are presented as a series of ATSDR reports. These reports provide comprehensive descriptions of information, data analyses and interpretations, and modeling results used to reconstruct historical contaminant exposure at Tarawa Terrace and vicinity. Each topical subject within the water-modeling analysis and historical reconstruction process is assigned a chapter letter. Specific topics for each chapter report are listed at right:

- **Chapter A**: Summary of Findings
- **Chapter B**: Geohydrologic Framework of the Castle Hayne Aquifer System
- **Chapter C**: Simulation of Groundwater Flow
- **Chapter D**: Properties and Degradation Pathways of Common Organic Compounds in Groundwater
- **Chapter E**: Occurrence of Contaminants in Groundwater
- **Chapter F**: Simulation of the Fate and Transport of Tetrachloroethylene (PCE) in groundwater
- **Chapter G**: Simulation of Three-Dimensional Multispecies, Multiphase Mass Transport of Tetrachloroethylene (PCE) and Associated Degradation By-Products
- **Chapter H**: Effect of Groundwater Pumping Schedule Variation on Arrival of Tetrachloroethylene (PCE) at Water-Supply Wells and the Water Treatment Plant
- **Chapter I**: Parameter Sensitivity, Uncertainty, and Variability Associated with Model Simulations of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water
- **Chapter J**: Field Tests, Data Analyses, and Simulation of the Distribution of Drinking Water
- **Chapter K**: Supplemental Information

Electronic versions of these reports and their supporting information and data will be made available on the ATSDR Camp Lejeune Web site at *http://www.atsdr.cdc.gov/sites/lejeune/index.html*.

Suggested citation:
Maslia ML, Sautner JB, Faye RE, Suárez-Soto RJ, Aral MM, Grayman WM, Jang W, Wang J, Bove FJ, Ruckart PZ, Valenzuela C, Green JW Jr, and Krueger AL. Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions—Executive Summary. Atlanta, GA: Agency for Toxic Substances and Disease Registry; 2007.

Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions

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By Morris L. Maslia, Jason B. Sautner, Robert E. Faye, René J. Suárez-Soto, Mustafa M. Aral, Walter M. Grayman, Wonyong Jang, Jinjun Wang, Frank J. Bove, Perri Z. Ruckart, Claudia Valenzuela, Joseph W. Green, Jr., and Amy L. Krueger

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Use of trade names and commercial sources is for identification only and does not imply endorsement by the Agency for Toxic Substances and Disease Registry or the U.S. Department of Health and Human Services.

Analyses of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water at Tarawa Terrace and Vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina: Historical Reconstruction and Present-Day Conditions

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Introduction

Three water-distribution systems have historically supplied drinking water to family housing at U.S. Marine Corps Base Camp Lejeune—Tarawa Terrace, Holcomb Boulevard, and Hadnot Point (Figure ES1). Two of the water-distribution systems were contaminated with volatile organic compounds (VOCs). Tarawa Terrace was contaminated mostly with tetrachloroethylene (PCE) and Hadnot Point was contaminated mostly with trichloroethylene (TCE). Historical information and data have indicated that one source of contamination—ABC One-Hour Cleaners—was responsible for contaminating Tarawa Terrace water-supply wells (Shiver 1985). Water-supply data and operational information indicate that Tarawa Terrace wells supplied water solely to the Tarawa Terrace water reatment plant (WTP). Additionally, the Tarawa Terrace water-distribution system was operated independently of he other two water-distribution systems (Holcomb Boulevard and Hadnot Point). Therefore, analyses presented in his Executive Summary and in reports described herein, refer solely to Tarawa Terrace and vicinity. Future analyses and reports will present information and data about contamination of the Hadnot Point water-distribution system.

Historical Background

The Agency for Toxic Substances and Disease Registry (ATSDR), an agency of the U.S. Department of Health and Human Services, is conducting an epidemiological study to evaluate whether in utero and infant (up to 1 year of age) exposures to drinking water contaminated with VOCs at U.S. Marine Corps Base Camp Lejeune, North Carolina, were associated with specific birth defects and childhood cancers. The study includes births occurring during the period 1968–1985 to pregnant women who resided in family housing at the base. Because limited measurements of contaminant and exposure data are available to support the epidemiological study, ATSDR is using water-modeling techniques to provide the epidemiological study with quantitative estimates of monthly contaminant levels in the drinking water. Results obtained by using water-modeling techniques, along with information from the mother on her water use, can be used by the epidemiological study to estimate the level and duration of exposures to the mother during her pregnancy and to the infant (up to 1 year of age). Using water-modeling techniques in such a process is referred to as historical reconstruction (Maslia et al. 2001).

Camp Lejeune is located in the Coastal Plain of North Carolina, in Onslow County, southeast of the City of Jacksonville and about 70 miles northwest of the City of Wilmington, North Carolina (Figure ES1). Operations began at the base during the 1940s. Today, nearly 150,000 people work and live on base, including active-duty personnel, dependents, retirees, and civilian employees. About two-thirds of the active-duty personnel and their dependents are less than 25 years of age. The base consists of 15 different housing areas; families live in base housing for an average of 2 years. During the 1970s and

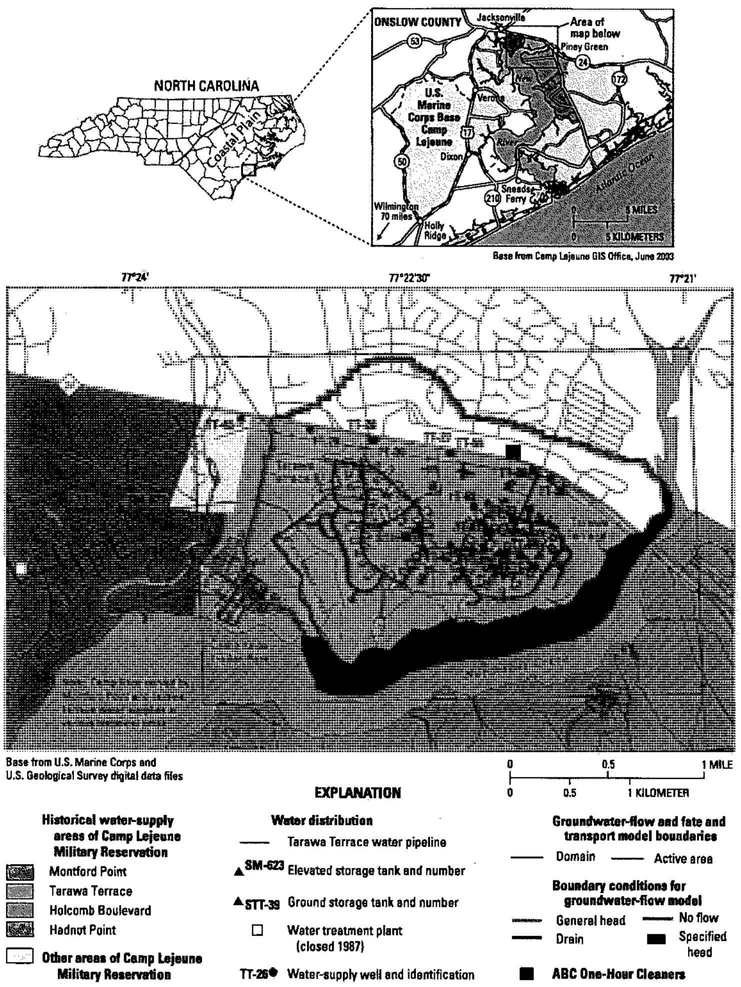

NORTH CAROLINA
Coastal Plain
ONSLOW COUNTY
Jacksonville
Area of map below
Piney Green
U.S. Marine Corps Base Camp Lejeune
Verona
Dixon
Sneads Ferry
Wilmington 70 miles
Holly Ridge
Atlantic Ocean
5 MILES
5 KILOMETERS
Base from Camp Lejeune GIS Office, June 2003
77°24'
77°22'30"
77°21'
34°45'
34°43'30"
Base from U.S. Marine Corps and U.S. Geological Survey digital data files
0
0.5
1 MILE
1 KILOMETER
EXPLANATION
Historical water-supply areas of Camp Lejeune Military Reservation
Montford Point
Tarawa Terrace
Holcomb Boulevard
Hadnot Point
Other areas of Camp Lejeune Military Reservation
Water distribution
Tarawa Terrace water pipeline
SM-623 Elevated storage tank and number
STT-39 Ground storage tank and number
Water treatment plant (closed 1987)
TT-26 Water-supply well and identification
Groundwater-flow and fate and transport model boundaries
Domain
Active area
Boundary conditions for groundwater-flow model
General head
No flow
Drain
Specified head
ABC One-Hour Cleaners

Figure ES1. Historical water-supply areas, groundwater-flow modeling area, and water-supply facilities used for historical reconstruction analyses, Tarawa Terrace and vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina.

1980s, family housing areas were served by three water-distribution systems—Hadnot Point, Tarawa Terrace, and Holcomb Boulevard (starting June 1972). Hadnot Point was the original water-distribution system serving the entire base with drinking water during the 1940s.

The documented onset of pumping at Tarawa Terrace is unknown but is estimated to have begun during 1952. Water-supply well TT-26, located about 900 feet southeast of ABC One-Hour Cleaners, began operations during 1952 (Figure ES1). ABC One-Hour Cleaners—an off-base dry-cleaning facility that used PCE in the dry-cleaning process (Melts 2001)—is the only documented source of PCE contamination of groundwater resources at Tarawa Terrace (Shiver 1985). The first occurrence of PCE contamination at a Tarawa Terrace water-supply well probably occurred at well TT-26 after the onset of dry-cleaning operations during 1953.

During 1989, the U.S. Environmental Protection Agency (USEPA) placed U.S. Marine Corps Base Camp Lejeune and ABC One-Hour Cleaners on its National Priorities List (NPL) of sites requiring environmental investigation (also known as Superfund sites). During August 1990, ATSDR conducted a public health assessment (PHA) at ABC One-Hour Cleaners. The PHA found that PCE, detected in onsite and offsite wells, was the primary contaminant of concern. Other detected contaminants included TCE, 1,2-dichloroethylene (1,2-DCE), *trans*-1,2-dichloroethylene (1,2-tDCE), 1,1-dichloroethylene (DCE), vinyl chloride (VC), benzene, and toluene (ATSDR 1990).

During 1997, ATSDR completed a PHA for the base, which concluded that estimated exposures to VOCs in drinking water were significantly below the levels shown to be of concern in animal studies. Thus, ATSDR determined that exposure to VOCs in on-base drinking water was unlikely to result in cancer and noncancer health effects in adults. However, because scientific data relating to the harmful effects of VOCs on a child or a fetus were limited, ATSDR recommended conducting an epidemiological study to assess the risks to infants and children from in utero exposure to chlorinated solvents (for example, PCE and TCE) contained in on-base drinking water (ATSDR 1997).

Following this recommendation, ATSDR published a study of adverse birth outcomes during 1998 (ATSDR 1998). ATSDR used various databases to evaluate possible associations between maternal exposure to contaminants contained in drinking water on the base and mean birth weight deficit, preterm birth (less than 37 weeks gestational age), and small for gestational age (SGA). To identify women living in base housing when they delivered, birth certificates were collected for live births that occurred January 1, 1968, through December 31, 1985. The study found that exposure to PCE in drinking water was related to an elevated risk of SGA for mothers older than 35 years or who experienced two or more prior fetal losses (ATSDR 1998; Sonnenfeld et al. 2001). The study could not, however, evaluate childhood cancers and birth defects. Because this study used incorrect information on the start-up date for the Holcomb Boulevard water treatment plant, errors were made in assigning exposures to the mothers. This study is being re-analyzed using the results from the historical reconstruction water modeling.

During 1999, ATSDR began an epidemiological study to evaluate whether in utero and infant (up to 1 year of age) exposure to VOC-contaminated drinking water was associated with specific birth defects and childhood cancers. The study includes births during 1968–1985 to women who resided at the base anytime during their pregnancy. The first year of the study, 1968, was chosen because North Carolina computerized its birth certificates starting in 1968. The last year of the study, 1985, was chosen because contaminated Tarawa Terrace water-supply wells were removed from regular service that year (February 1985). The study is evaluating the central nervous system defects known as neural tube defects (i.e., spina bifida and anencephaly), cleft lip and cleft palate, and childhood leukemia and non-Hodgkin's lymphoma. The study consists of a multistep process that includes:

- a scientific literature review to identify particular childhood cancers and birth defects associated with exposure to VOC-contaminated drinking water,
- a telephone survey to identify potential cases,
- a medical records search to confirm the diagnoses of the reported cases, and
- a case-control study to interview parents (collect information on a mother's residential history and water use as well as potential risk factors such as a mother's occupation and illnesses during pregnancy) and obtain exposure estimates through water-modeling analyses and the historical reconstruction process.

During 2004, the study protocol received approval from the Centers for Disease Control and Prevention Institutional Review Board and the U.S. Office of Management and Budget.

Tarawa Terrace Reports

Owing to the complexity, uniqueness, and the number of topical subjects included in the historical reconstruction process, a number of reports are being prepared that provide comprehensive descriptions of information, data, and methods used to conduct historical and present-day (2004) analyses at Tarawa Terrace and vicinity. Table ES1 lists the 11 chapters (A–K) and chapter titles of reports that compose the complete description and details of the historical reconstruction process used for the Tarawa Terrace analyses. Also included in Table ES1 are listings of the authors and a topical summary of each chapter report. The Chapter A report—Summary of Findings—provides a summary of detailed technical findings (found in Chapters B–K) focusing on the historical reconstruction analysis and present-day conditions of groundwater flow, contaminant fate and transport, and distribution of drinking water at Tarawa Terrace and vicinity. Also contained in Chapter A are brief summaries of all of the other chapter reports and a searchable electronic database—on digital video disc (DVD) format—of information and data sources used to conduct the historical reconstruction analysis.

Information and data used for the water-modeling analyses were obtained from a variety of sources, such as ATSDR, USEPA, Environmental Management Division of U.S. Marine Corps Base Camp Lejeune, U.S. Geological Survey, private consulting organizations, published scientific literature, and community groups representing former marines and their families. Readers interested in details for a specific analysis (for example, numerical model development, model calibration procedures, synoptic maps showing groundwater migration of PCE at Tarawa Terrace, or uncertainty analysis) should consult the appropriate chapter report listed in Table ES1. Electronic versions of each chapter report described above and supporting information and data will be made available at the ATSDR Camp Lejeune Web site at *http://www.atsdr.cdc.gov/sites/lejeune/index.html.*

Water-Distribution Investigation

To reconstruct historical exposures, a reliable chronology related to operations of the identified source of the PCE contamination, ABC One-Hour Cleaners, and of water-supply facilities (wells and the WTP) is of utmost importance. This information will have a direct impact on the reliability and accuracy of estimates derived for the levels and duration of exposure to contaminated drinking water. Using a variety of information sources and references, events related to water supply and contamination of groundwater and drinking water at Tarawa Terrace and vicinity are shown graphically and explained in Figure ES2. One of the purposes of Figure ES2 is to present, in a graphical manner, the relation among water supply, contamination events, exposure to contaminated drinking water in family housing areas, selected simulation results, and the time frame of the epidemiological case-control study. For the first time, all of these different types of information and data sources are summarized in one document that is believed to be an accurate reconciliation of chronological events that relate to Tarawa Terrace and vicinity. Three events are noteworthy: (1) the year shown for the start of operations of ABC One-Hour Cleaners (1953) is used as the starting time for PCE contamination of groundwater in the fate and transport modeling of PCE, (2) sampling events and PCE concentration values of tap water are shown for 1982, and (3) the closure of the Tarawa Terrace WTP is shown during March 1987. Thus, care has been taken to assure that chronological event information and data required for modeling analyses and the historical reconstruction process are consistent and in agreement for all of the Tarawa Terrace reports and reflect the most up-to-date information.

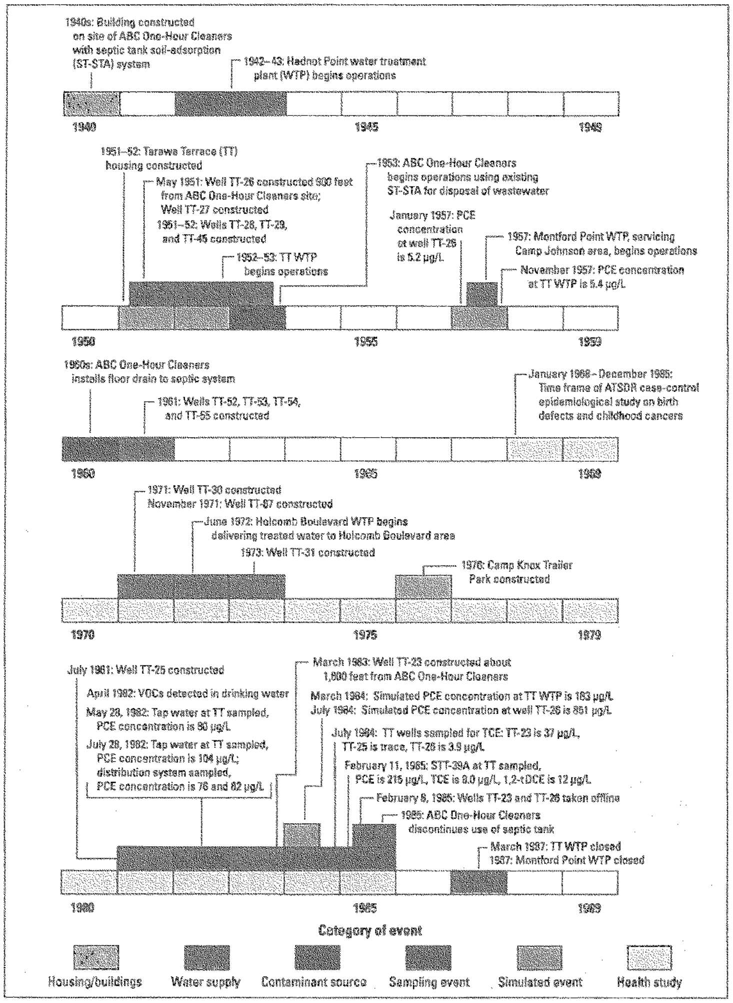
Occurrence of Contaminants in Groundwater

Detailed analyses of concentrations of PCE at groundwater sampling locations and at Tarawa Terrace water-supply wells during the period 1991–1993 were sufficient to estimate the mass, or amount, of PCE remaining in the Tarawa Terrace and Upper Castle Hayne aquifers. Similar methods were applied to compute the mass of PCE in the unsaturated zone (zone above the water table) at and in the vicinity of ABC One-Hour Cleaners using concentration-depth data determined from soil borings. This information and data were necessary to develop accurate and reliable databases to conduct model simulations of the fate and transport of PCE from its source—ABC One-Hour Cleaners—to Tarawa Terrace water-supply wells and WTP. The total mass of PCE computed in groundwater and within the unsaturated zone during the period 1953–1985 equals about 6,000 pounds and equates to a volume of about 430 gallons. This volume represents an average minimum loss rate of PCE to the subsurface at ABC One-Hour Cleaners of about 13 gallons per year during the period 1953–1985.

Table ES1. Summary of ATSDR chapter reports on topical subjects of water-modeling analyses and the historical reconstruction process, Tarawa Terrace and vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina.

[ATSDR, Agency for Toxic Substances and Disease Registry; VOC, volatile organic compound; PCE, tetrachloroethylene; WTP, water treatment plant]

Report chapter	Author(s)	Chapter title and reference citation	Topical summary
A	Maslia ML, Sautner JB, Faye RE, Suárez-Soto RJ, Aral MM, Grayman WM, Jang W, Wang J, Bove FJ, Ruckart PZ, Valenzuela C, Green JW Jr, and Krueger AL	Summary of Findings; Maslia et al. (In press 2007a)	Summary of detailed technical findings (found in Chapters B–K) focusing on the historical reconstruction analysis and present-day conditions of groundwater flow, contaminant fate and transport, and distribution of drinking water
B	Faye RE	Geohydrologic Framework of the Castle Hayne Aquifer System; Faye (In press 2007a)	Analyses of well and geohydrologic data used to develop the geohydrologic framework of the Castle Hayne aquifer system at Tarawa Terrace and vicinity
C	Faye RE, and Valenzuela C	Simulation of Groundwater Flow; Faye and Valenzuela (In press 2007)	Analyses of groundwater flow including developing a predevelopment (steady state) and transient groundwater flow model
D	Lawrence SJ	Properties and Degradation Pathways of Common Organic Compounds in Groundwater; Lawrence (In press 2007)	Describes and summarizes the properties, degradation pathways, and degradation by-products of VOCs (non-trihalomethane) commonly detected in groundwater
E	Faye RE, and Green JW Jr	Occurrence of Contaminants in Groundwater; Faye and Green (In press 2007)	Describes the occurrence and distribution of PCE and related contaminants within the Tarawa Terrace aquifer and the Upper Castle Hayne aquifer system at and in the vicinity of the Tarawa Terrace housing area
F	Faye RE	Simulation of the Fate and Transport of Tetrachloroethylene (PCE); Faye (In press 2007b)	Historical reconstruction of the fate and transport of PCE in groundwater from the vicinity of the ABC One-Hour Cleaners to individual water-supply wells and the Tarawa Terrace WTP
G	Jang W, and Aral MM	Simulation of Three-Dimensional Multispecies, Multiphase Mass Transport of Tetrachloroethylene (PCE) and Associated Degradation By-Products; Jang and Aral (In press 2007)	Description about the development and application of a model capable of simulating three-dimensional, multispecies, and multiphase transport of PCE and associated degradation by-products
H	Wang J, and Aral MM	Effect of Groundwater Pumping Schedule Variation on Arrival of Tetrachloroethylene (PCE) at Water-Supply Wells and the Water Treatment Plant; Wang and Aral (In press 2007)	Analysis of the effect of groundwater pumping schedule variation on the arrival of PCE at water-supply wells and the Tarawa Terrace WTP
I	Maslia ML, Suárez-Soto RJ, Wang J, Aral MM, Sautner JB, and Valenzuela C	Parameter Sensitivity, Uncertainty, and Variability Associated with Model Simulations of Groundwater Flow, Contaminant Fate and Transport, and Distribution of Drinking Water; Maslia et al. (In press 2007b)	Assessment of parameter sensitivity, uncertainty, and variability associated with model simulations of groundwater flow, contaminant fate and transport, and the distribution of drinking water
J	Sautner JB, Valenzuela C, Maslia ML, and Grayman WM	Field Tests, Data Analyses, and Simulation of the Distribution of Drinking Water; Sautner et al. (In press 2007)	Field tests, data analyses, and simulation of the distribution of drinking water at Tarawa Terrace and vicinity
K	Maslia ML, Sautner JB, Faye RE, Suárez-Soto RJ, Aral MM, Grayman WM, Jang W, Wang J, Bove FJ, Ruckart PZ, Valenzuela C, Green JW Jr, and Krueger AL	Supplemental Information; Maslia et al. (In press 2007c)	Additional information such as synoptic maps showing groundwater levels, directions of groundwater flow, and the distribution of PCE based on simulation; a complete list of references; and other auxiliary information and data that were used as the basis of the study


1940s: Building constructed on site of ABC One-Hour Cleaners with septic tank soil-adsorption (ST-STA) system

1942–43: Hadnot Point water treatment plant (WTP) begins operations

1951–52: Tarawa Terrace (TT) housing constructed

May 1951: Well TT-26 constructed 900 feet from ABC One-Hour Cleaners site; Well TT-27 constructed

1951–52: Wells TT-28, TT-29, and TT-45 constructed

1952–53: TT WTP begins operations

1953: ABC One-Hour Cleaners begins operations using existing ST-STA for disposal of wastewater

January 1957: PCE concentration at well TT-26 is 5.2 µg/L

1957: Montford Point WTP, servicing Camp Johnson area, begins operations

November 1957: PCE concentration at TT WTP is 5.4 µg/L

1960s: ABC One-Hour Cleaners installs floor drain to septic system

1961: Wells TT-52, TT-53, TT-54, and TT-55 constructed

January 1968–December 1985: Time frame of ATSDR case-control epidemiological study on birth defects and childhood cancers

1971: Well TT-30 constructed

November 1971: Well TT-67 constructed

June 1972: Holcomb Boulevard WTP begins delivering treated water to Holcomb Boulevard area

1973: Well TT-31 constructed

1976: Camp Knox Trailer Park constructed

July 1981: Well TT-25 constructed

April 1982: VOCs detected in drinking water

May 28, 1982: Tap water at TT sampled, PCE concentration is 80 µg/L

July 28, 1982: Tap water at TT sampled, PCE concentration is 104 µg/L; distribution system sampled, PCE concentration is 76 and 82 µg/L

March 1983: Well TT-23 constructed about 1,600 feet from ABC One-Hour Cleaners

March 1984: Simulated PCE concentration at TT WTP is 183 µg/L

July 1984: Simulated PCE concentration at well TT-26 is 851 µg/L

July 1984: TT wells sampled for TCE: TT-23 is 37 µg/L, TT-25 is trace, TT-26 is 3.9 µg/L

February 11, 1985: STT-39A at TT sampled, PCE is 215 µg/L, TCE is 8.0 µg/L, 1,2-tDCE is 12 µg/L

February 8, 1985: Wells TT-23 and TT-26 taken offline

1985: ABC One-Hour Cleaners discontinues use of septic tank

March 1987: TT WTP closed

1987: Montford Point WTP closed

Figure ES2. Chronology of events related to supply and contamination of drinking water at Tarawa Terrace and vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina. (STT-39A is the pump house associated with storage tank STT-39.) [ft, foot; µg/L, microgram per liter; PCE, tetrachloroethylene; TCE, trichloroethylene; 1,2-tDCE, *trans*-1,2-dichloroethylene; maximum contaminant levels: PCE 5 µg/L, TCE 5 µg/L, 1,2-tDCE 100 µg/L]

Approach for Reconstructing Historical Concentrations

A simulation or modeling approach was used to reconstruct and estimate (quantify) historical concentrations of PCE in finished water[1] that was delivered to residents of Tarawa Terrace. In using a simulation approach, a calibration process is used so that the combination of various model parameters—regardless of whether a model is simple or complex—reproduces the behavior of real-world systems (for example, migration of PCE) as closely as possible. Calibration of models used for the Tarawa Terrace analyses was accomplished in a step-wise approach consisting of four successive stages or levels. Simulation results achieved for each calibration level were refined by adjusting model parameter values and comparing these results with simulation results of previous levels until results at all levels satisfactorily conformed to preselected calibration targets or measures. The step-wise order of model calibration levels consisted of simulating (1) predevelopment (steady or nonpumping) groundwater-flow conditions, (2) transient (time varying or pumping) groundwater-flow conditions, (3) the fate and transport (migration) of PCE from its source at ABC One-Hour Cleaners, and (4) the concentration of PCE in finished water at the Tarawa Terrace WTP—water from the Tarawa Terrace WTP that was delivered to residents living in base housing.

To understand the calibration process from a nontechnical point of view, it is useful to view the step-wise approach used to estimate the concentration of PCE in finished water from the Tarawa Terrace WTP in terms of venn or set diagrams (Borowski and Borwein 1991). These diagrams are useful for showing logical relations between sets or groups of like items and are shown in Figure ES3 for each calibration level. At level 1 (Figure ES3*a*), there may be a large number of combinations of model parameters that yield solutions to predevelopment (steady, nonpumping) groundwater-flow conditions. However, only a smaller set—the subset of solutions indicated by circle "A" in Figure ES3*a*—yields acceptable combinations of parameters for a calibrated predevelopment groundwater flow model. For transient (time-varying and pumping) groundwater-flow conditions, feasible solutions are indicated by circle "B" (Figure ES3*b*). However, only those solutions that satisfy both predevelopment and transient groundwater flow can be accepted and classified as resulting in calibrated transient and predevelopment groundwater-flow models. These select and fewer solutions are indicated by the intersection of circles "A" and "B." The transient groundwater-flow simulations provide velocity information (rate of groundwater flow or discharge) required to conduct a fate and transport simulation. Feasible solutions for the fate and transport analysis are indicated by circle "C" (Figure ES3*c*). Only those solutions that satisfy: (a) predevelopment flow, (b) transient groundwater flow, and (c) contaminant fate and transport are accepted and classified as resulting in a calibrated contaminant fate and transport model. These solutions are even fewer than for predevelopment and transient groundwater flow and are indicated by the intersection of circles "A," "B," and "C." The fourth level used to determine historical

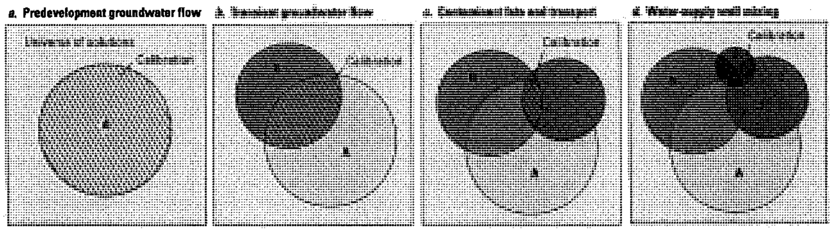


Figure ES3. Venn diagrams showing step-wise approach of model calibration used to estimate concentration of finished water: *(a)* predevelopment groundwater flow, *(b)* transient groundwater flow, *(c)* contaminant fate and transport, and *(d)* water-supply well mixing, Tarawa Terrace and vicinity, U.S. Marine Corps Base Camp Lejeune, North Carolina.

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[1] Finished water—groundwater that has undergone treatment at a water treatment plant and is delivered to a person's home. For this study, the concentration of treated water at the water treatment plant is considered the same as the concentration of water delivered to a person's home

concentrations of finished water was to develop a calibrated mixing model for uncontaminated and PCE-contaminated groundwater from water-supply wells. Feasible solutions depend on calibrated solutions for the previous three levels of model calibration, thereby resulting in even fewer calibrated solutions to the mixing model—circle "D" in Figure ES3*d*. Thus, only solutions that satisfy all four levels of model calibration, indicated by the intersection of circles "A," "B," "C," and "D" provide reasonable estimates for the concentration of PCE in finished water at the WTP that was distributed through the network of storage tanks and pipelines to residents of Tarawa Terrace and vicinity.

Results of Water-Modeling Analyses

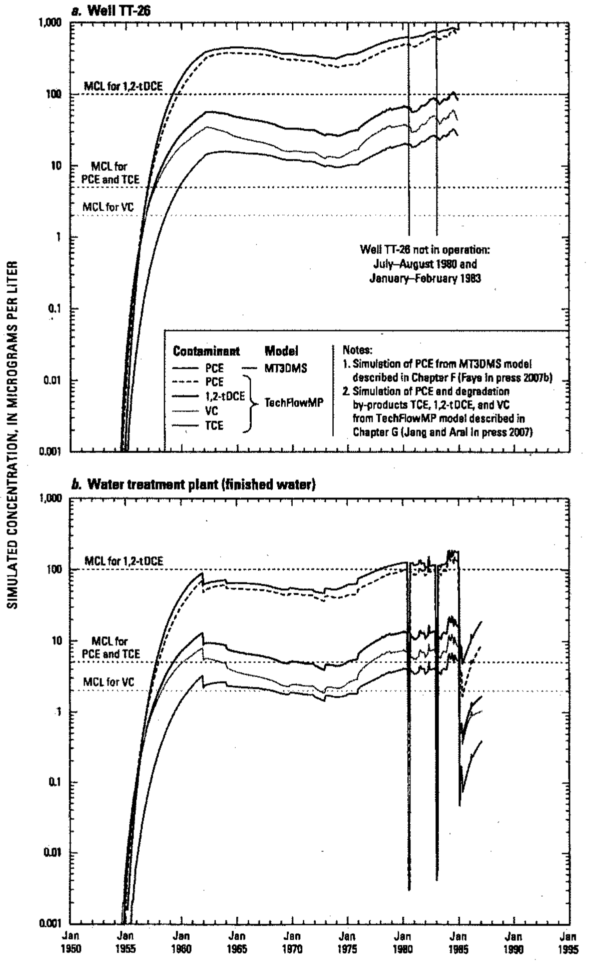
The fate and transport (migration) of a contaminant in groundwater (level 3 of the step-wise calibration process described previously) is a complex physical phenomenon. There can be a variety of mathematical and modeling approaches used to address this process depending on the complexities being investigated. Modeling approaches can range from highly complex to very simple.

Two types of models were used to reconstruct the migration of PCE from its source to the Tarawa Terrace water-supply wells. The first model, MODFLOW-96/ MT3DMS (Harbaugh and McDonald 1996; Zheng and Wang 1999), simulated transient groundwater flow and PCE as a single contaminant dissolved in groundwater. The second model, TechFlowMP (Jang and Aral 2007) considered PCE and its degradation by-products of TCE, 1,2-tDCE, and VC in both the dissolved phase (in groundwater) and the vapor phase (i.e., in the unsaturated zone above the water table). Both approaches yielded similar results for the concentrations of PCE at water-supply wells (Figure ES4*a*). Once the concentrations of PCE and PCE degradation by-products were simulated at water-supply wells, a mixing model based on the principles of continuity and conservation of mass (Masters 1998) was used to determine the concentration of PCE and degradation by-products in finished water delivered to residents of Tarawa Terrace from the WTP (Figure ES4*b*). Results obtained using the historical reconstruction process and modeling analyses indicate that contamination of water-supply well TT-26 at a concentration exceeding the maximum contaminant level (MCL) for PCE of 5 micrograms per liter (μg/L) occurred during January 1957. Finished water delivered from the Tarawa Terrace WTP exceeded the MCL for PCE during November 1957. Simulation of PCE degradation by-products showed that the concentration of TCE in finished water delivered from the WTP ranged from about 1–10 μg/L and was generally below the MCL for TCE of 5 μg/L (Figure ES4*b*).

The models and model results described above are based on limited field data and literature-derived values. Therefore, the models and results are characterized by uncertainty (lack of knowledge about specific factors) and variability (observed differences that can be attributed to differences in model parameters). This gives rise to the question, what confidence does ATSDR have in the historically reconstructed estimates of concentration such as results shown in Figure ES4? To answer this question and address issues of uncertainty and variability, ATSDR and its partners conducted exhaustive sets of additional simulations to estimate (quantify) confidence in models and their results.

One approach used to conduct these additional simulations and estimate confidence in model results is referred to as a probabilistic analysis. This method uses a procedure called Monte Carlo analysis (also referred to as Monte Carlo simulation). This is a computer-based method of analysis that uses statistical sampling techniques to obtain a probabilistic approximation to the solution of a mathematical equation or model (USEPA 1997). Applying a probabilistic analysis to the groundwater flow and fate and transport models (MODFLOW-96 and MT3DMS, respectively) described previously allowed water modelers to express results for PCE concentration in finished water in terms of a range of results and the confidence one has in those results.

An example of probabilistic results derived by using Monte Carlo analysis is shown in Figure ES5. In this illustration, the concentration of PCE in finished water is shown as a range of most likely values for each month that the Tarawa Terrace WTP was in operation—January 1953–February 1987. As can be seen, the probabilistic results form a very narrow range or band around simulated concentration values obtained from running the groundwater-flow and fate and transport models without considering uncertainty and variability (referred to as the deterministic or single-value output approach). The range of PCE concentrations in finished water for each month of WTP operations represents 95 percent of



Notes:
1. Simulation of PCE from MT3DMS model described in Chapter F (Faye in press 2007b)
2. Simulation of PCE and degradation by-products TCE, 1,2-tDCE, and VC from TechFlowMP model described in Chapter G (Jang and Aral in press 2007)

Figure ES4. Simulated concentration of tetrachloroethylene (PCE) and degradation by-products trichloroethylene (TCE), trans-1,2-dichloroethylene (1,2-tDCE), and vinyl chloride (VC) at *(a)* water-supply well TT-26 and *(b)* water treatment plant (finished water), Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina. [MCL, maximum contaminant level]

Monte Carlo simulations (yellow band in Figure ES5). That is, there is a 95 percent probability that PCE concentrations in finished water delivered to residents of Tarawa Terrace from the WTP were within the band or range of values shown in Figure ES5 for each month that the WTP was operating.

Two specific results shown in Figure ES5 are worthy of further explanation. First, PCE concentrations in WTP finished water most likely exceeded the MCL for PCE of 5 µg/L for the first time during October 1957–August 1958 (95 percent probability). This range includes the date of November 1957 derived without considering uncertainty and variability. Second, the PCE concentration in WTP finished water during January 1985, simulated using the probabilistic analysis, ranges from 110–251 µg/L (95 percent of Monte Carlo simulations). This range includes the calibrated value of 176 µg/L (derived without considering uncertainty and variability) and the maximum measured value of 215 µg/L. Therefore, these probabilistic analysis results—obtained by using Monte Carlo simulation—provide a sense of confidence in the historically reconstructed PCE concentrations that were delivered to residents of Tarawa Terrace in finished water from the WTP.

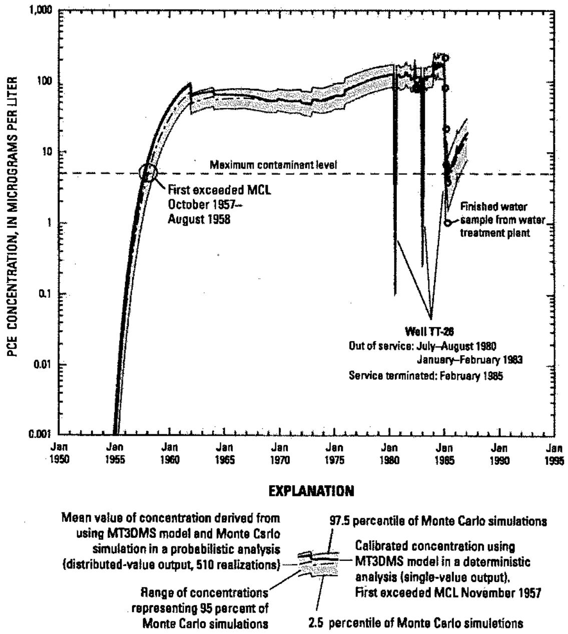


Figure ES5. Concentrations of tetrachloroethylene (PCE) in finished water at the water treatment plant derived from probabilistic analysis using Monte Carlo simulation, Tarawa Terrace, U.S. Marine Corps Base Camp Lejeune, North Carolina. [MCL, maximum contaminant level]

Conclusions

Based on field data, modeling results, and the historical reconstruction process, the following conclusions are made:

1. PCE concentrations exceeded the MCL of 5 μg/L at water-supply well TT-26 for 333 months—January 1957–January 1985;
2. The maximum simulated PCE concentration of well TT-26 exceeded 850 μg/L;
3. PCE concentrations exceeded the MCL of 5 μg/L in finished water at the Tarawa Terrace WTP for 346 months—November 1957–February 1987;
4. The maximum simulated PCE concentration in finished water from the Tarawa Terrace WTP exceeded 180 μg/L;
5. PCE concentrations in finished water exceeding the MCL of 5 μg/L at the Tarawa Terrace WTP could have been delivered as early as December 1956. Based on probabilistic analyses, the most likely dates that finished water first exceeded the MCL ranged from October 1957 to August 1958 (95 percent probability), with an average first exceedance date of November 1957; and
6. Exposure to PCE-contaminated drinking water ceased after February 1987.

Questions and Answers

What is the purpose of the ATSDR health study?

Two of the three drinking-water systems that served family housing at U.S. Marine Corps Base Camp Lejeune were contaminated. One system, the Tarawa Terrace drinking-water system, was mostly contaminated with tetrachloroethylene (or perchloroethylene, PCE) from off-base dry-cleaning operations. The other system, the Hadnot Point drinking-water system, was contaminated mostly with trichloroethylene (TCE) from on-base industrial operations. The contaminated wells were continuously used until 1985 and sporadically used until early 1987. ATSDR's health study will try to determine if there was a link between in utero and infant (up to 1 year of age) exposures to drinking-water contaminants and specific birth defects and childhood cancers. The study includes births occurring during 1968–1985 to mothers who lived in base family housing during their pregnancy. The birth defects and childhood cancers that will be studied are:

- neural tube defects (spina bifida and anencephaly),
- cleft lip and cleft palate, and
- leukemia and non-Hodgkin's lymphoma.

Why is ATSDR studying exposure to VOC-contaminated drinking water since other studies have already done this?

Only a few studies have looked at the risk of birth defects and childhood cancers among children born to women exposed during pregnancy to volatile organic compounds (VOCs) such as TCE and PCE in drinking water. This study is unique because it will estimate monthly levels of drinking-water contaminants to determine exposures.

What is in the ATSDR reports about the Tarawa Terrace drinking-water system?

Chapter A provides a summary of detailed technical findings (found in Chapters B–K) for Tarawa Terrace and vicinity. The findings focus on modeling techniques used to reconstruct historical and present-day conditions of groundwater flow, contaminant fate and transport, and distribution of drinking water. Information from the water-modeling analyses will be given to researchers conducting the health study. (Future analyses and reports will present information and data about the Hadnot Point drinking-water system.)

Why is ATSDR using water modeling to estimate exposure rather than real data?

Data on the levels of VOC contaminants in drinking water are not available before 1982. To determine levels before 1982, ATSDR is using a process called "historical reconstruction." This process uses data on the amount of the chemicals dumped on the ground. It also uses the properties of the soil, the groundwater, and the water-distribution system. These data are then used in computer models. The models estimate when contaminants first reached drinking-water wells. The models also estimate monthly levels of contaminants in drinking water at family housing units. This information is important for the health study. It can also be used by those who lived in base family housing to estimate their exposures.

What is a water model?

A water model is a general term that describes a computer program used to solve a set of mathematical equations that describe the:

- flow of groundwater in aquifers,
- movement of a contaminant mixed with groundwater,
- mixing of water from contaminated and uncontaminated water-supply wells at a water treatment plant, or
- flow of water and contaminants from reservoirs, wells, and storage tanks through a network of pipelines.

What information did ATSDR use to develop the water models and what were the sources of the information?

The historical reconstruction process required information and data describing physical characteristics of the groundwater-flow system, conservation principles that describe the flow system, the specific data on the contaminant (PCE) and its degradation by-products, and the water-distribution system. The following specific data needs were required:

- aquifer characteristics: geohydrologic, hydraulic, water production, fate, transformation, and transport;
- chemical properties characteristics: physical, fate, transformation, and transport; and
- water-distribution system characteristics: pipeline characteristics, storage-tank geometry, pumps, water-production data, and water-quality parameters.

Information and data used to conduct the historical reconstruction analysis were obtained from a variety of sources. These sources included ATSDR, U.S. Environmental Protection Agency, Environmental Management Division of U.S. Marine Corps Base Camp Lejeune, U.S. Geological Survey, private consulting organizations, published scientific literature, and community groups representing former marines and their families. Chapters A and K of the Tarawa Terrace report provide searchable electronic databases—on DVD format—of information and data sources used to conduct the historical reconstruction analysis.

How can ATSDR be sure that water-modeling results represent historical "real-world" conditions?

A water model requires information on the specific properties or "parameters" of the soil, groundwater, and water system at the base. Often assumptions are needed because complete and accurate data are not available for all the parameters that must be modeled. In particular, historical data are often lacking. To be sure that water-modeling results are accurate and represent historical "real-world" conditions, a model needs to be calibrated. A calibration process compares model results with available "real-world" data to see if the model's results accurately reflect "real-world" conditions. This is done in the following way. Models are constructed using different combinations of values for the parameters. Each model makes a prediction about the groundwater flow rate, the amount of water produced by each well, and the contamination level in the drinking-water system at a particular point in time. These predictions are then compared to "real-world" data. When the combination of parameter values that best predicts the actual "real-world" conditions are selected, the model is "calibrated." The model is now ready to make predictions about historical conditions.

Why did ATSDR develop and calibrate two models for simulating the migration of PCE from ABC One-Hour Cleaners to Tarawa Terrace water-supply wells?

At first, ATSDR developed a model that simulated the fate and transport (migration) of PCE that was completely mixed in groundwater in the saturated zone (zone below the water table). The model code used is known as MT3DMS. ATSDR developed a second model because of suggestions from a panel of experts and requests from former marines and their technical advisers. The second model is capable of simulating the fate and transport of PCE and its degradation by-products of TCE, *trans*-1,2-dichloroethylene (1,2-tDCE), and vinyl chloride (VC) in the unsaturated zone (area above the water table) and the saturated zone. This model, known as TechFlowMP, is based on significantly more complex mathematical equations and formulations. This highly complex model also can simulate PCE and its degradation by-products in both the vapor and water phases. Values of simulated PCE concentrations in the saturated zone obtained using the two different models (MT3DMS and TechFlowMP) are very close.

Why is ATSDR providing simulated PCE concentrations in finished water at the Tarawa Terrace water treatment plant (WTP) rather than at locations of specific family housing units?

ATSDR did in-depth reviews of historical data, including water-supply well and WTP operational data when available. ATSDR concluded that the Tarawa Terrace water-distribution system—including the WTP—was *not* interconnected with other water-distribution systems at Camp Lejeune for any time longer than 2 weeks. All water arriving at the WTP was obtained solely from Tarawa Terrace water-supply wells. Also it was assumed to be completely and uniformly mixed prior to delivery to residents of Tarawa Terrace. On a monthly basis, the concentration of PCE delivered to specific family housing units at Tarawa Terrace was assumed to be the same as the simulated concentration of PCE in finished water at the WTP.

Can ATSDR water modeling results be used to determine the concentration of PCE that my family and I were exposed to on a daily basis?

No. The available data are not specific enough to accurately estimate daily levels of PCE in the Tarawa Terrace water system. The modeling approach used by ATSDR provides a high level of detail and accuracy to estimate monthly PCE exposure concentrations in finished water at the Tarawa Terrace WTP. It is assumed that simulated monthly concentrations of PCE represent a typical day during a month.

Were my family and I more exposed to contaminated drinking water than other families because we lived near one of the contaminated Tarawa Terrace water-supply wells?	No. Water from all Tarawa Terrace water-supply wells (uncontaminated and contaminated) was mixed at the WTP prior to being distributed through a network of pipelines to storage tanks and family housing areas. On a monthly basis, the concentration of PCE delivered to specific family housing units at Tarawa Terrace has been shown to be the same as the concentration of PCE in finished water at the WTP.
Were my family and I exposed to other contaminants besides PCE in finished drinking water while living in family housing at Tarawa Terrace?	Yes. A small amount of PCE degrades in the groundwater to other VOCs. These include TCE, 1,2-tDCE, and VC. Degradation by-products of PCE were found in water samples obtained on January 16, 1985, from Tarawa Terrace water-supply wells TT-23 and TT-26. Historical reconstruction analyses conducted by ATSDR and its partners provide simulated monthly concentrations of PCE and its degradation by-products in finished water at the Tarawa Terrace WTP.
How can I get a list of the monthly PCE (and PCE degradation by-product) concentrations in finished water that my family and I were exposed to at Tarawa Terrace?	ATSDR and its partners have developed a Web site where former Camp Lejeune residents can enter the dates they lived on base and receive information on whether they were exposed to VOCs and to what levels. The Web site will list the simulated monthly concentrations of PCE and its degradation by-products in finished water at the Tarawa Terrace WTP. The Web site can be accessed at *http://www.atsdr.cdc.gov/sites/lejeune/index.html.*
ATSDR's historical reconstruction analysis documents that Tarawa Terrace drinking water was contaminated with PCE that exceeded the maximum contaminant level (MCL) of 5 micrograms per liter (µg/L) during 1957 and reached a maximum value of 183 µg/L. What does this mean in terms of my family's health?	ATSDR's exposure assessment cannot be used to determine whether you, or your family, suffered any health effects as a result of past exposure to PCE-contaminated drinking water at Camp Lejeune. The study will help determine if there is an association between certain birth defects and childhood cancers among children whose mothers used this water during pregnancy. Epidemiological studies such as this help improve scientific knowledge of the health effects of these chemicals. The National Toxicology Program of the U.S. Department of Health and Human Services has stated that PCE "is reasonably anticipated to be a human carcinogen." However, the lowest level of PCE in drinking water at which health effects begin to occur is unknown. The MCL for PCE was set at 5 µg/L (or 5 parts per billion) in 1989 because, given the technology at that time, 5 µg/L was the lowest level that water systems could be required to achieve. Many factors determine whether people will suffer adverse health effects because of chemical exposures. These factors include: • dose (how much), • duration (how long the contact period is), • when in the course of life the exposures occurred (for example, while in utero, during early childhood, or in later years of life), • genetic traits that might make a person more vulnerable to the chemical exposure, and • other factors such as occupational exposures, exposures to other chemicals in the environment, gender, diet, lifestyle, and overall state of health.

How certain is ATSDR that finished water exceeding the MCL for PCE of 5 µg/L was delivered from the Tarawa Terrace WTP beginning in November 1957?

Historical data on the levels of contaminants in the drinking water is very limited. That is why there is uncertainty and variability concerning when the MCL of 5 µg/L was reached at the Tarawa Terrace WTP. Therefore, ATSDR and its partners conducted exhaustive sets of simulations to quantify this uncertainty and variability. Based on these analyses, finished water contaminated with PCE exceeding the MCL of 5 µg/L could have been delivered from the Tarawa Terrace WTP as early as December 1956 but most likely during November 1957.

How does ATSDR know where all of the Tarawa Terrace water-supply wells were located if they have been destroyed? What is the accuracy of this information?

ATSDR relied on a variety of sources to obtain information on the location of Tarawa Terrace water-supply wells. These included historical water utility maps, well construction and location maps, aerial photographs, use of geographic information system technology, and assistance from Environmental Management Division staff at U.S. Marine Corps Base Camp Lejeune. The accuracy of this information is believed to be within ±50 feet of the actual well location.

What did ATSDR do to be sure that water-modeling analyses are scientifically credible?

Throughout this investigation, ATSDR has sought external expert input and review. Activities included convening an expert peer review panel and submitting individual chapter reports to outside national and international experts for technical reviews. For example, on March 28–29, 2005, ATSDR convened an external expert panel to review the approach used in conducting the historical reconstruction analysis. The panel also provided input and recommendations on preliminary analyses and modeling. ATSDR used a number of recommendations made by the panel members. ATSDR also used technical comments from outside expert reviewers when finalizing reports on Tarawa Terrace water-modeling analyses.

Where and how can I get a copy of this ATSDR report and the information and data that were used in the Tarawa Terrace water-modeling analyses?

A small number of printed copies of this report and subsequent chapter reports (A–K) will be available to interested parties and placed in public repositories. Electronic versions of all chapter reports will be available on the ATSDR Camp Lejeune Web site at *http://www.atsdr.cdc.gov/sites/lejeune/index.html*. Chapters A and K provide a searchable electronic database—on DVD format—of information and data sources used to conduct the historical reconstruction analysis for Tarawa Terrace and vicinity.

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Zheng C, and Wang PP. MT3DMS: A Modular Three-Dimensional Multi-Species Model for Simulation of Advection, Dispersion, and Chemical Reactions of Contaminants in Groundwater Systems: Documentation and User's Guide. Vicksburg, MS: U.S. Army Engineer Research and Development Center; 1999. Report No.: SERDP-99.

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For additional information write to:

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Exposure-Dose Reconstruction Project
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry
1600 Clifton Road, Mail Stop E-32
Atlanta, Georgia 30333

Glossary and Abbreviations

Definitions of terms and abbreviations used throughout this report are listed below.

ATSDR—Agency for Toxic Substances and Disease Registry

biodegradation—transformation of substances into new compounds through biochemical reactions or the actions of microorganisms, such as bacteria. Typically expressed in terms of a rate constant or half-life (USEPA 2004). The new compounds are referred to as degradation by-products (for example, TCE, 1,2-tDCE, and VC are degradation by-products of PCE)

DCE—1,1-dichloroethylene

1,2-tDCE—*trans*-1,2-dichloroethylene or *trans*-1,2-dichloroethene

degradation by-product—see biodegradation

DVD—digital video disc

epidemiological study—study to determine whether a relation exists between the occurrence and frequency of a disease and a specific factor such as exposure to a toxic compound found in the environment

exposure—pollutants or contaminants that come in contact with the body and present a potential health threat

fate and transport—also known as mass transport; a process that refers to how contaminants move through, and are transformed in, the environment

finished water—groundwater that has undergone treatment at a water treatment plant and is delivered to a person's home. For this study, the concentration of treated water at the water treatment plant is considered the same as the concentration of water delivered to a person's home

historical reconstruction—diagnostic analysis used to examine historical characteristics of groundwater flow, contaminant fate and transport, water-distribution systems, and exposure

MCL—maximum contaminant level; a legal threshold limit set by the USEPA on the amount of a hazardous substance that is allowed in drinking water under the Safe Drinking Water Act; usually expressed as a concentration in milligrams or micrograms per liter

MODFLOW-96—three-dimensional groundwater-flow model, 1996 version, developed by the U.S. Geological Survey

Monte Carlo analysis—also referred to as Monte Carlo simulation; a computer-based method of analysis that uses statistical sampling techniques to obtain a probabilistic approximation to the solution of a mathematical equation or model (USEPA 1997)

MT3DMS—three-dimensional mass transport, multispecies model developed by C. Zheng and P. Wang on behalf of the U.S. Army Engineer Research and Development Center in Vicksburg, Mississippi

NPL—National Priorities List; the USEPA's official list of uncontrolled hazardous waste sites which are to be cleaned up under the Superfund legislation

PCE—tetrachloroethene, 1,1,2,2-tetrachloroethylene, or perchloroethylene; also known as PERC® or PERK®

PHA—public health assessment; an evaluation conducted by ATSDR of data and information on the release of hazardous substances into the environment in order to assess any past, present, or future impact on public health

SGA—small for gestational age; a term used to describe when an infant's weight is very low given their gestational week of birth

TCE—1,1,2-trichloroethene or 1,1,2-trichloroethylene

TechFlowMP—three-dimensional multispecies, multiphase mass transport model developed by the Multimedia Environmental Simulations Laboratory at the Georgia Institute of Technology, Atlanta, Georgia

µg/L—micrograms per liter; 1 part per billion, a unit of concentration

uncertainty—lack of knowledge about specific factors, parameters, or models (for example, one is uncertain about the mean value of the concentration of PCE at the source)

unsaturated zone—zone or area above the water table

USEPA—U.S. Environmental Protection Agency

variability—observed differences attributable to heterogeneity or diversity in a model parameter, an exposure parameter, or a population

VC—vinyl chloride or chlorethene

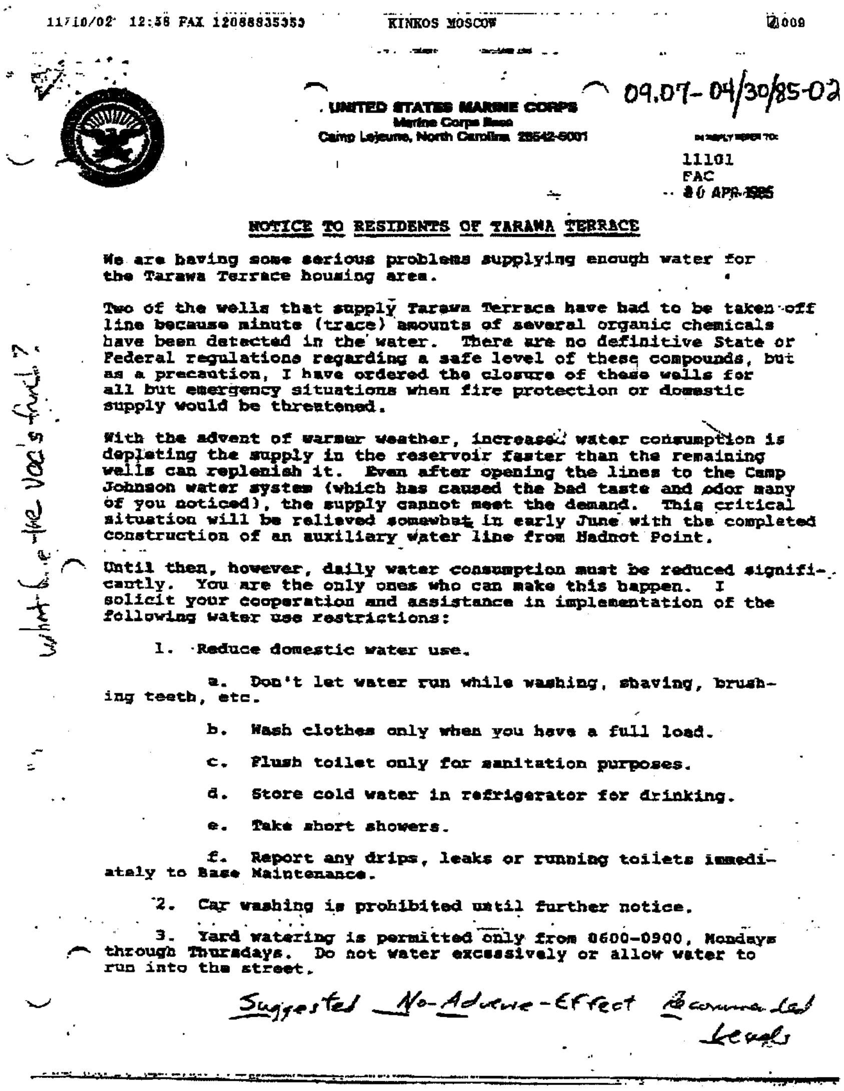
venn diagram—diagram that shows the mathematical or logical relationship between different groups or sets; the diagram shows all the possible logical relations between the sets

VOC—volatila organic compound; an organic chemical compound that has a high enough vapor pressure under normal circumstances to significantly vaporize and enter the atmosphere. VOCs are considered environmental pollutants, and some may be carcinogenic

water-distribution system—water-conveyance network consisting of hydraulic facilities such as wells, reservoirs, storage tanks, high-service and booster pumps, and a network of pipelines for delivering drinking water

water table—also known as the phreatic surface; the surface where the water pressure is equal to atmospheric pressure

WTP—water treatment plant



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09.07-04/30/85-02

UNITED STATES MARINE CORPS
Marine Corps Base
Camp Lejeune, North Carolina 28542-5001

IN REPLY REFER TO:
11101
FAC
30 APR 1985

NOTICE TO RESIDENTS OF TARAWA TERRACE

We are having some serious problems supplying enough water for the Tarawa Terrace housing area.

Two of the wells that supply Tarawa Terrace have had to be taken off line because minute (trace) amounts of several organic chemicals have been detected in the water. There are no definitive State or Federal regulations regarding a safe level of these compounds, but as a precaution, I have ordered the closure of these wells for all but emergency situations when fire protection or domestic supply would be threatened.

what were the VOC's found?

With the advent of warmer weather, increased water consumption is depleting the supply in the reservoir faster than the remaining wells can replenish it. Even after opening the lines to the Camp Johnson water system (which has caused the bad taste and odor many of you noticed), the supply cannot meet the demand. This critical situation will be relieved somewhat in early June with the completed construction of an auxiliary water line from Hadnot Point.

Until then, however, daily water consumption must be reduced significantly. You are the only ones who can make this happen. I solicit your cooperation and assistance in implementation of the following water use restrictions:

1. Reduce domestic water use.

   a. Don't let water run while washing, shaving, brushing teeth, etc.

   b. Wash clothes only when you have a full load.

   c. Flush toilet only for sanitation purposes.

   d. Store cold water in refrigerator for drinking.

   e. Take short showers.

   f. Report any drips, leaks or running toilets immediately to Base Maintenance.

2. Car washing is prohibited until further notice.

3. Yard watering is permitted only from 0600-0900, Mondays through Thursdays. Do not water excessively or allow water to run into the street.

Suggested No-Adverse-Effect Recommended Levels

Subj: NOTICE TO RESIDENTS OF TARAWA TERRACE

Thank you for your understanding in this matter. If these measures are effective in reducing overall water usage, we should be able to open the Tarawa Terrace swimming pool as scheduled. We will keep you informed.

L. H. BUEHL
Major General, U.S. Marine Corps
Commanding General

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 11 2007

ASSISTANT ADMINISTRATOR
FOR ENFORCEMENT AND
COMPLIANCE ASSURANCE

The Honorable John D. Dingell
Chairman
Committee on Energy and Commerce
United States House of Representatives
Washington, D.C. 20515-6115

Dear Chairman Dingell:

I am responding to your letters dated June 8, 2007, requesting that the Environmental Protection Agency provide the Director of the Office of Criminal Enforcement, Forensics and Training, Peter Murtha, and an EPA Criminal Investigation Division Special Agent to testify at an Oversight Subcommittee hearing regarding Camp Lejeune scheduled for June 12, 2007, EPA respects your role as Chairman and is committed to providing the Subcommittee the information necessary to satisfy its oversight activities to the extent possible, consistent with Constitutional and statutory obligations. In response to your June 7, 2007 letter requesting criminal investigative materials regarding Camp Lejeune, EPA identified important Executive Branch confidentiality interests, and as an accommodation provided unredacted copies of these materials to you for oversight purposes. EPA also requested that the committee not publicly disclose the unredacted files or information contained therein. Through this accommodation, EPA does not waive any confidentiality interests in these documents or similar documents in other circumstances.

With respect to your request for Mr. Murtha and the Special Agent to appear at a hearing, Mr. Murtha is submitting written testimony for Tuesday's hearing and will appear to answer the Subcommittee's questions regarding EPA's criminal investigation of the drinking water contamination/exposures at Camp Lejeune. EPA has identified important Executive Branch confidentiality interests regarding your request to hear testimony in this matter from its Special Agent and has appreciated the opportunity to discuss our concerns with your staff. As an accommodation to your request for the Special Agent's testimony at the hearing, EPA has made the Special Agent available for extensive briefings in order to provide the Subcommittee with the information necessary to accommodate its oversight interests while protecting the Executive Branch's interests. In this letter, I am outlining our concerns further.

First, EPA generally pursues accommodation to avoid public testimony by its line agents and staff. EPA has a strong institutional interest in ensuring that appropriate supervisory personnel, rather than line employees answer Congressional questions regarding Agency actions. In part, this is based upon our view that supervisory personnel, not line employees, make the decisions that are the subject of your review, and therefore should be the ones to explain those decisions. Moreover, agents must be able to exercise the independent judgment essential to the integrity of law enforcement functions without outside interference. By questioning supervisory personnel, such as Mr. Murtha, Congress can fulfill its oversight responsibilities without undermining the independence of line agents.

Second, EPA has a strong interest in maintaining a low public profile for its law enforcement agents to preserve our capacity to conduct safe and effective undercover investigations. EPA's Criminal Enforcement Division's size precludes it from employing specialized undercover operatives, yet its investigations require the availability of agents who can work without fear of public identification. Moreover, the Special Agent you have asked to appear has participated and may again participate in undercover operations. Rather than publicly identifying a federal agent who has worked -- and may again be needed to work -- in an undercover capacity, EPA can accommodate your need for information from this Special Agent through additional briefings or through the Special Agent's supervisory personnel.

While EPA is unable to agree to the Special Agent testifying at the hearing, as a further accommodation, if the Subcommittee agrees, the Special Agent could be present at the hearing in the front row of the gallery to ensure that Mr. Murtha, who would be testifying, has access to the information needed to efficiently respond to the Subcommittee. This arrangement would accommodate the Subcommittee's oversight needs while preserving important Executive Branch confidentiality interests. By participating in this way, EPA could avoid public identification of the Special Agent and help insure the independence of a line agent.

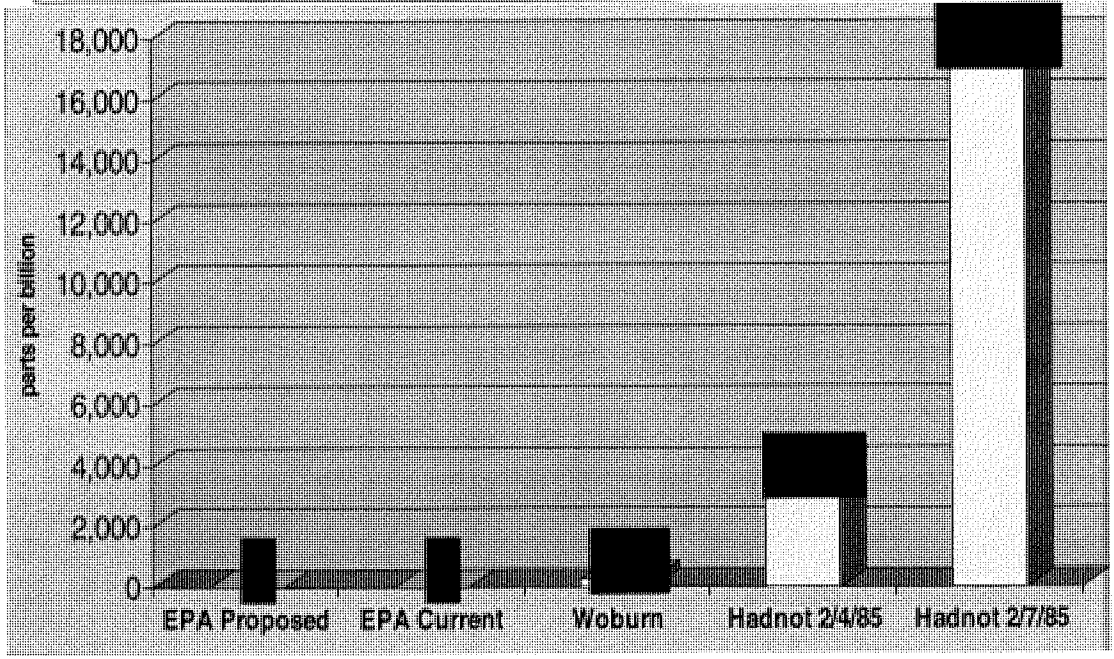
I look forward to hearing from your staff regarding this offer of accommodation. If you have further questions, your staff may contact Carolyn Levine in the Office of Congressional and Intergovernmental Relations at (202) 564-1859.

Sincerely,

Granta Y. Nakayama

Granta Y. Nakayama

TCE Levels in Drinking Water—Woburn and Camp Lejeune



This Table Shows Significant Inaccuracies in ATSDR's HazDat Database,

Sample of 5 Data Points

Site	**HazDat Database**	**ATSDR Response**
Nebraska Ordnance Plant	630,000 ppb TCE in municipal/public groundwater contamination	**HazDat is wrong.** TCE contamination was far less - 700ppb
Mather Air Force Base	800 ppb TCE in municipal/public groundwater contamination	**HazDat is wrong.** TCE contamination was not in municipal/public groundwater, it was in a monitoring well.
Air Force Plant #4	11,000 ppb TCE in municipal/public groundwater contamination	**HazDat is wrong.** TCE contamination was not in municipal/public groundwater, it was a monitoring well.
McClelland Air Force Base	2,000 ppb TCE in municipal/public groundwater	**HazDat data correct.**
Wurtsmith Air Force Base	1,100 ppb TCE in tap water	**HazDat data correct.**

Ex. #	Description	Date
1	Subcommittee on Oversight and Investigations Witness List	6/12/2007
2	Water Testing Data	10/21/1980
3	Water Testing Data	12/18/1980
4	Water Testing Data	12/18/1980
5	Water Testing Data	2/26/1981
6	Letter from Grainger Labs to the Commanding General, Marine Corps Base, Camp Lejeune	8/10/1982
7	Water Testing Data	1/18/1985
8	Letter from Carol Aloisio, Office of Assistant Administrator, ATSDR, to Yvonne Walker, CIH, navy Environmental Health Center, concerning problems obtaining requested documents	9/2/1994
9	Memo from Kelly Dreyer concerning the ATSDR study	8/26/1997
10	Memo from Kelly Dreyer concerning the ATSDR study	8/20/1997
11	Memo from Neal Paul to Scott Brewer concerning the public reaction to the water contamination and trying to get information on the ATSDR questionnaire	10/15/1998
12	Memo from Neal Paul to Kelly Dreyer concerning the public reaction to the ATSDR study	10/23/1998
13	Memo from Kelly Dreyer to Neal Paul and other military personnel requesting a meeting to set up the Public Relations Team	December 1998
14	Criminal Investigation Division, Summary of Investigation, Marine Corps Base, Camp Lejeune	April 2005
15	Camp Lejeune Declination	
16	The National Academies Press Release: "Evidence Growing on Health Risks From TCE; Current Data are Sufficient for EPA to Finalize Risk Assessment."	7/27/2006
17	The National Academies Report in Brief: "Assessing the Human Health Risks of Trichloroethylene: Key Scientific Issues."	July 2006
18	Documents received from Jerome Ensminger	
19	Department of Navy, Bureau of Medicine and Surgery document, re: "Standards for Potable Water."	12/13/1972
20	Chart re: "Significant Inaccuracies in ATSDR's HazDat Database, Sample of 5 Data Points	6/12/2007
21	Preliminary Information in Response to 6/6/07 Letter Requesting Information re: Department of Defense Sites with Private or Municipal Well Water Contamination	6/11/2007
22	ATSDR HazDat Database: Municipal/Public Tap Water Contaminated with TCE at Concentrations Above EPA MCL 5 ppb	6/12/2007

Exhibit # 1

HENRY A. WAXMAN, CALIFORNIA
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DENNIS B. FITZGIBBONS, CHIEF OF STAFF
GREGG A. ROTHSCHILD, CHIEF COUNSEL

ONE HUNDRED TENTH CONGRESS

U.S. House of Representatives

Committee on Energy and Commerce

Washington, DC 20515–6115

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MARSHA BLACKBURN, TENNESSEE

SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS

DATE:	Tuesday, June 12, 2007
TIME AND PLACE:	10:00 a.m. in Room 2322 Rayburn House Office Building
SUBJECT:	"Poisoned Patriots: Contaminated Drinking Water at Camp Lejeune."

WITNESS LIST

Panel I

Mr. Jerome Ensminger
North Carolina

Dr. Mike Gros
Texas

Mr. Jeff Byron
Ohio

continued…

Witness List
Subcommittee on Oversight and Investigations Hearing
June 12, 2007
Page 2

Panel II

United States Marine Corps

Major General Robert C. Dickerson, Jr.
Commanding General
PSC Box 20005
Camp Lejeune, NC 28542-0005

Accompanied by Ms. Kelly A. Dreyer
Environmental Restoration Program Manager
Headquarters, U.S. Marine Corps (I&L)
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Washington, DC 20380-1775

United States Navy

Ms. Pat Leonard
Director
Office of The Judge Advocate General
Claims, Investigations, & Tort Litigation (Code 15)
1322 Patterson Avenue, Suite 3000
Washington Navy Yard, DC 20374-5066

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Department of Health and Human Services

Thomas Sinks, Ph.D.
Deputy Director
National Center for Environmental Health/ATSDR
Mail Stop E-28
1600 Clinton Road
Atlanta, GA 30333

Accompanied by Frank Bove, Sc.D.
Senior Epidimiologist
and
Morris Maslia, P.E.
Environmental Engineer

continued...

Witness List
Subcommittee on Oversight and Investigations Hearing
June 12, 2007
Page 3

Panel III

Mr. Peter J. Murtha
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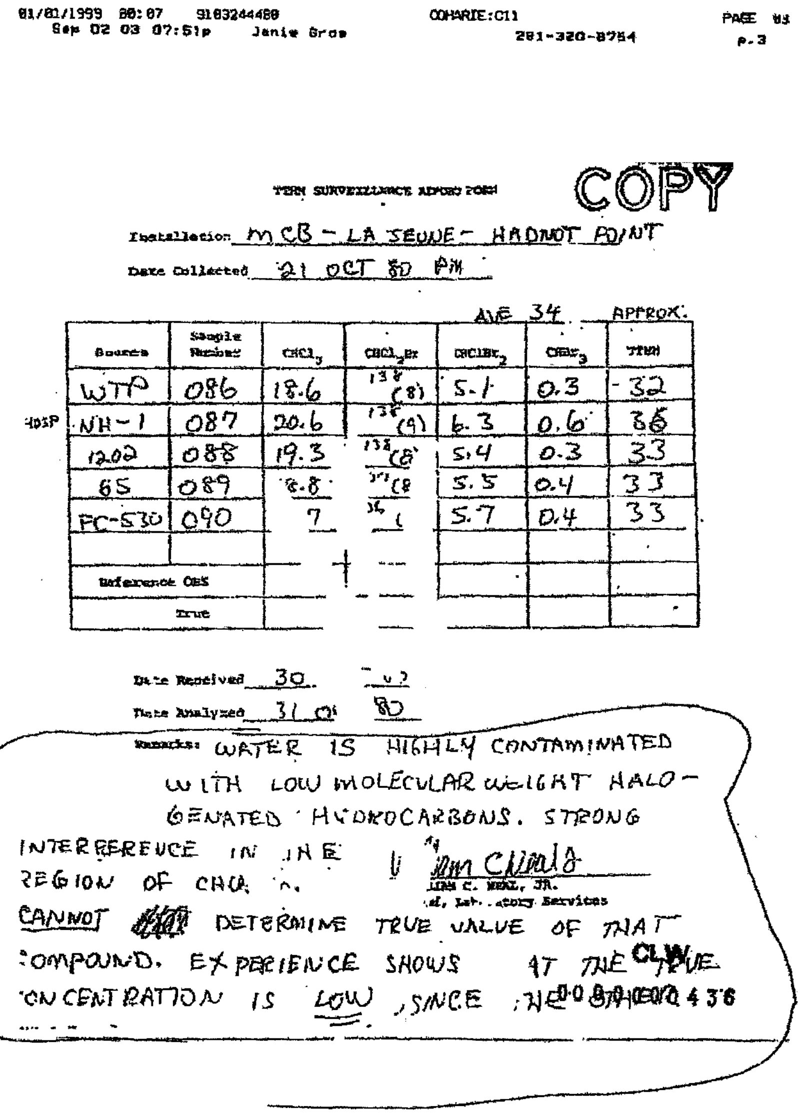
Forensics, and Training
Office of Enforcement and Compliance Assurance
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

Accompanied by Mr. Tyler Amon
Special Agent
Criminal Investigation Division

Mr. Franklin Hill
Director
Superfund Division
U.S. Environmental Protection Agency
Region 4
61 Forsyth Street, SW
Atlanta, GA 30303

Marcia G. Crosse, Ph.D.
Director, Public Health and Military Health Care Issues
U.S. Government Accountability Office
441 G Street, NW, Room 5K21
Washington, DC 20548

Exhibit # 2



01/01/1999 00:07 9103244480 COHARIE:C11 PAGE 03
Sep 02 03 07:51p Janie Gros 281-320-8754 p.3

TTHM SURVEILLANCE REPORT FORM

COPY

Installation: MCB - LA JEUNE - HADNOT POINT

Date Collected: 21 OCT 80 PM

AVE 34 APPROX.

	Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	TTHM
	WTP	086	18.6	138 (8)	5.1	0.3	32
HOSP	NH-1	087	20.6	138 (9)	6.3	0.6	36
	1202	088	19.3	138 (8	5.4	0.3	33
	65	089	8.8	37 (8	5.5	0.4	33
	FC-530	090	7	36 (	5.7	0.4	33
	Reference OBS						
	True						

Date Received: 30 [illegible]

Date Analyzed: 31 O 80

Remarks: WATER IS HIGHLY CONTAMINATED WITH LOW MOLECULAR WEIGHT HALOGENATED HYDROCARBONS. STRONG INTERFERENCE IN THE REGION OF CHCl₃. CANNOT DETERMINE TRUE VALUE OF THAT COMPOUND. EXPERIENCE SHOWS AT THE TRUE CONCENTRATION IS LOW, SINCE THE

LIAM C. NEAL, JR.
al, Lab. atory Services

CLW 0000000436

Exhibit # 3

NAVY

TTHM SURVEILLANCE REPORT FORM

Installation CAMP LEJEUNE - HADNOT POINT
Date Collected 18 DEC 80 PM

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	ug/L TTHM
WTP	N 111	20.0	?	6.2	1.0	27 +
NH-1	112	18.7	?	7.0	1.2	25 +
1202	113	19.3	?	6.8	1.1	27 +
65	114	19.9	?	6.4	1.0	27 +
EC-530	115	19.8	?	7.3	1.2	28 +
Reference OBS						
True						

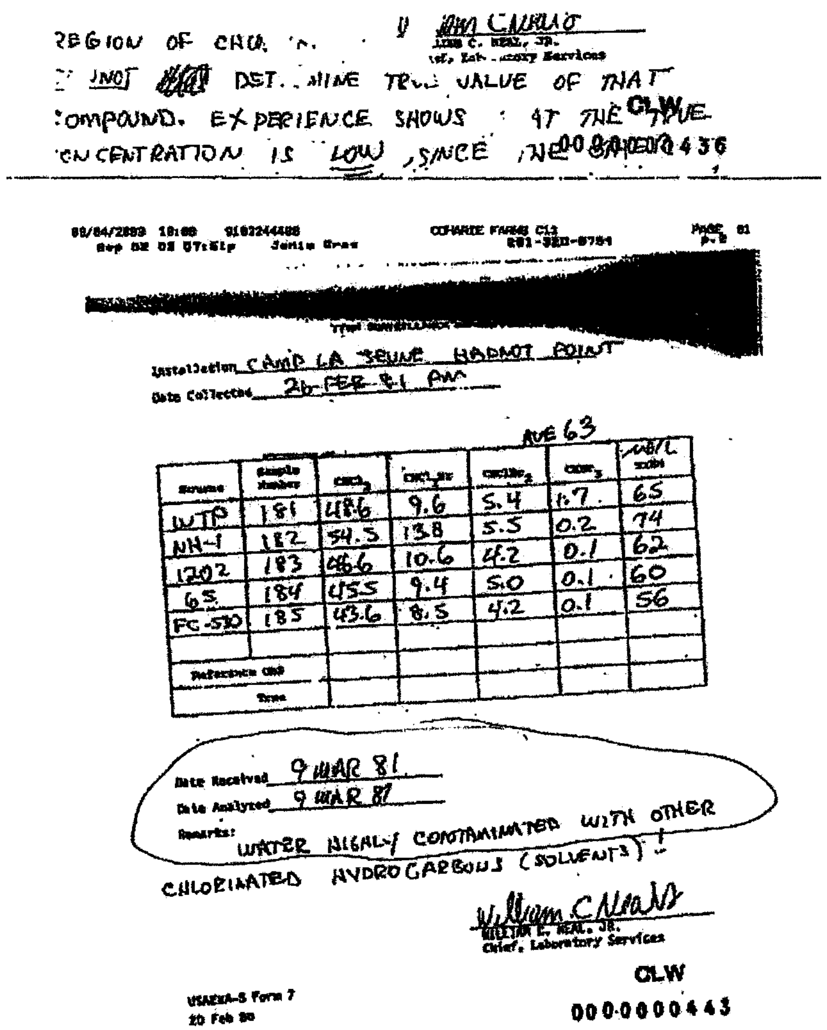
Date Received 29 DEC 80
Date Analyzed 8 JAN 81
Remarks: 22

HEAVY ORGANIC INTERFERENCE AT $CHCl_2Br$, YOU NEED TO ANALYZE FOR CHLORINATED ORGANICS BY GC/MS. William C Neal Jr

WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80

Exhibit # 4



REGION OF CHLO... William C Neal
...C. NEAL, JR.
...f, Lab...atory Services

... NOT DET...MINE TRUE VALUE OF THAT
COMPOUND. EXPERIENCE SHOWS ...AT THE TRUE
...CENTRATION IS LOW, SINCE THE

CLW
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Sep 02 03 07:51p Janie Gray 601-320-0754 p.2

[redacted]

Installation CAMP LA JEUNE HADNOT POINT
Date Collected 26 FEB 81 AM

AVE 63

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	µg/l total
WTP	181	48.6	9.6	5.4	1.7	65
NH-1	182	54.5	13.8	5.5	0.2	74
1202	183	46.6	10.6	4.2	0.1	62
65	184	45.5	9.4	5.0	0.1	60
FC-530	185	43.6	8.5	4.2	0.1	56
Reference [illegible]						
True						

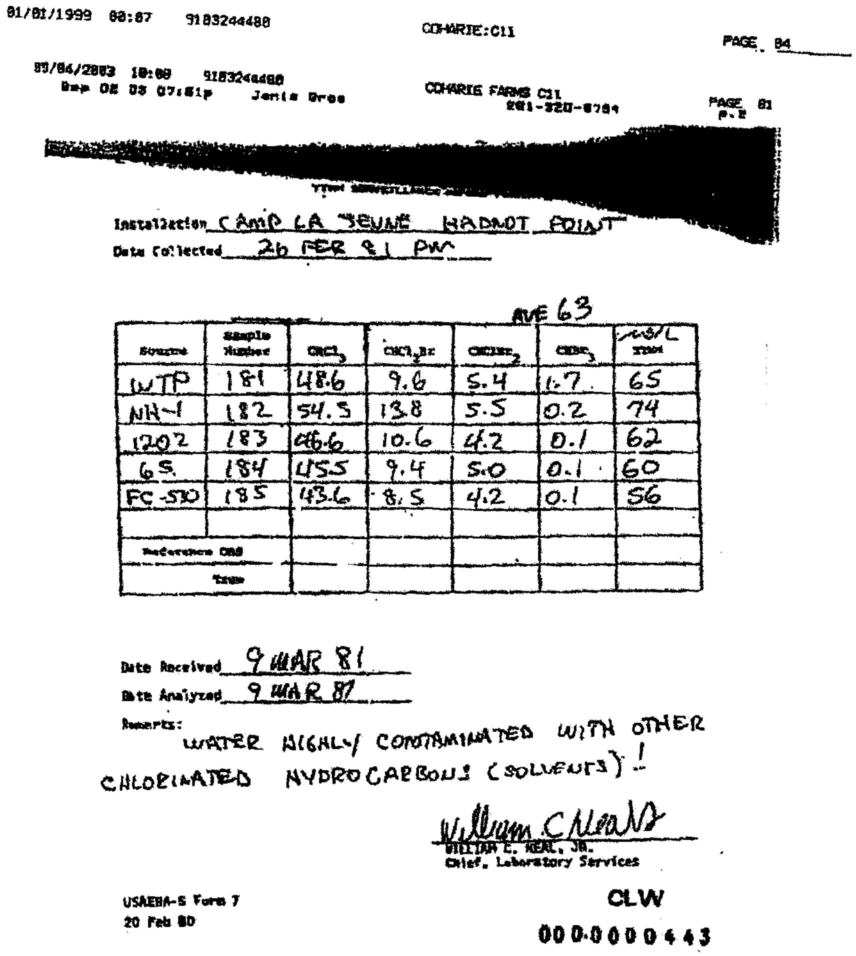
Date Received 9 MAR 81
Date Analyzed 9 MAR 81
Remarks: WATER HIGHLY CONTAMINATED WITH OTHER CHLORINATED HYDROCARBONS (SOLVENTS)!

William C Neal
WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80

CLW
0000000443

Exhibit # 5



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09/04/2003 10:00 9183244480 COHARIE FARMS C11 PAGE 01

Sep 02 03 07:51p Jenis Gree 281-320-0784 p.2

TTHM SURVEILLANCE

Installation CAMP LA JEUNE HADNOT POINT

Date Collected 26 FEB 81 PM

AVE 63

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	ug/L TTHM
WTP	181	48.6	9.6	5.4	1.7	65
NH-1	182	54.5	13.8	5.5	0.2	74
1202	183	46.6	10.6	4.2	0.1	62
65	184	45.5	9.4	5.0	0.1	60
FC-530	185	43.6	8.5	4.2	0.1	56
Reference CBS						
True						

Date Received 9 MAR 81

Date Analyzed 9 MAR 81

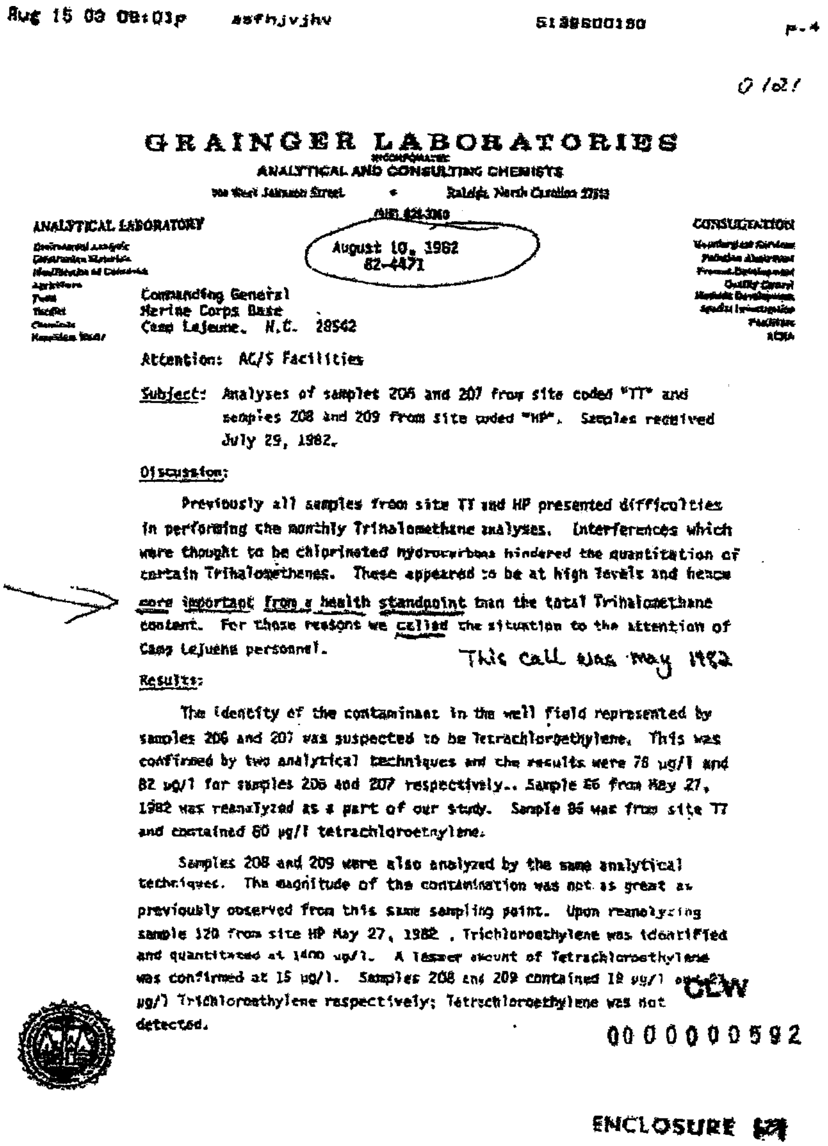
Remarks:
WATER HIGHLY CONTAMINATED WITH OTHER CHLORINATED HYDROCARBONS (SOLVENTS)!

William C Neal

WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80

Exhibit # 6



Aug 15 03 08:03p asfhjvjhv 5138600180 p.4

0 /021

GRAINGER LABORATORIES
INCORPORATED
ANALYTICAL AND CONSULTING CHEMISTS
[illegible] West Johnson Street • Raleigh, North Carolina [illegible]
[illegible]

ANALYTICAL LABORATORY

CONSULTATION

August 10, 1982
82-4471

Commanding General
Marine Corps Base
Camp Lejeune, N.C. 28542

Attention: AC/S Facilities

Subject: Analyses of samples 206 and 207 from site coded "TT" and samples 208 and 209 from site coded "HP". Samples received July 29, 1982.

Discussion:

Previously all samples from site TT and HP presented difficulties in performing the monthly Trihalomethane analyses. Interferences which were thought to be chlorinated hydrocarbons hindered the quantitation of certain Trihalomethanes. These appeared to be at high levels and hence more important from a health standpoint than the total Trihalomethane content. For these reasons we called the situation to the attention of Camp Lejeune personnel.

This call was May 1982

Results:

The identity of the contaminant in the well field represented by samples 206 and 207 was suspected to be Tetrachloroethylene. This was confirmed by two analytical techniques and the results were 76 µg/l and 82 µg/l for samples 206 and 207 respectively.. Sample 86 from May 27, 1982 was reanalyzed as a part of our study. Sample 86 was from site TT and contained 80 µg/l tetrachloroethylene.

Samples 208 and 209 were also analyzed by the same analytical techniques. The magnitude of the contamination was not as great as previously observed from this same sampling point. Upon reanalyzing sample 120 from site HP May 27, 1982, Trichloroethylene was identified and quantitated at 1400 µg/l. A lesser amount of Tetrachloroethylene was confirmed at 15 µg/l. Samples 208 and 209 contained 19 µg/l [illegible] µg/l Trichloroethylene respectively; Tetrachloroethylene was not detected.

CLW

0000000592

ENCLOSURE [illegible]

August 10, 1982
Page 2

Prior to this report, the samples from July 28, 1982 from site HP were analyzed. Traces of both solvents were found in this set. Though not quantitated, the level of Trichloroethylene seems to be in the range of that which was found in samples 208 and 209. The sample which showed the most contamination relative to the others was 205. Also sample 168 from site TT on July 28, 1982 was analyzed and shown to contain 104 ug/l Tetrachloroethylene.

Conclusion:

Tetrachloroethylene was identified as the contaminant in the well field coded "TT". Its concentration seems relatively stable over the period in which it has been examined. It was confirmed that the well field coded "HP" has shown contamination by Trichloroethylene and Tetrachloroethylene. These levels have been variable over the per studied and are now at significantly lower levels than when first encountered. The following table summarizes the findings:

Sample	Date Taken	Site Code	Tri chloroethylene	Tetra-chloroethylene
206	7-27-82	TT	-	76
207	7-27-82	TT	-	82
85	5-27-82	TT	-	80
168	7-28-82	TT	-	104
208	7-27-82	HP	15	<1
209	7-27-82	HP	21	<1
120	5-27-82	HP	1400	15
205	7-28-82	HP	No Data	1.0

Bruce A. Babson
Bruce A. Babson
Chemist

BAB/sb
Customer #92400

CLW

ENCLOSURE [2]

Exhibit # 7

Navy Sample 651 received 1-18-85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL432 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0414 #651

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2-2-85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	386 ~~N.D.~~
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	187 ~~N.D.~~	87V trichloroethylene	3200 ~~N.D.~~
30V 1,2-trans-dichloroethylene	3400 ~~N.D.~~	88V vinyl chloride	655 ~~N.D.~~

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

'avy sample #651 ··ceived 2-7-85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOA SPL 497 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-050Z #651 1410 250 ul → 5000 1:20 Dilution

METHOD NO. 624 DETECTION LIMIT 200 ug/lit

ANALYSIS DATE 2/8/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	397 ~~N.D.~~
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	17600 ~~N.D.~~
30V 1,2-trans-dichloroethylene	~~N.D.~~ 8070	88V vinyl chloride	* 179 ~~N.D.~~

* Below Method Detection Limit

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

Ty sample #651 recd 2-7-85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL496 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0501 #651 1410 1:20 Dilution

METHOD NO. 624 DETECTION LIMIT 200 ug/lit

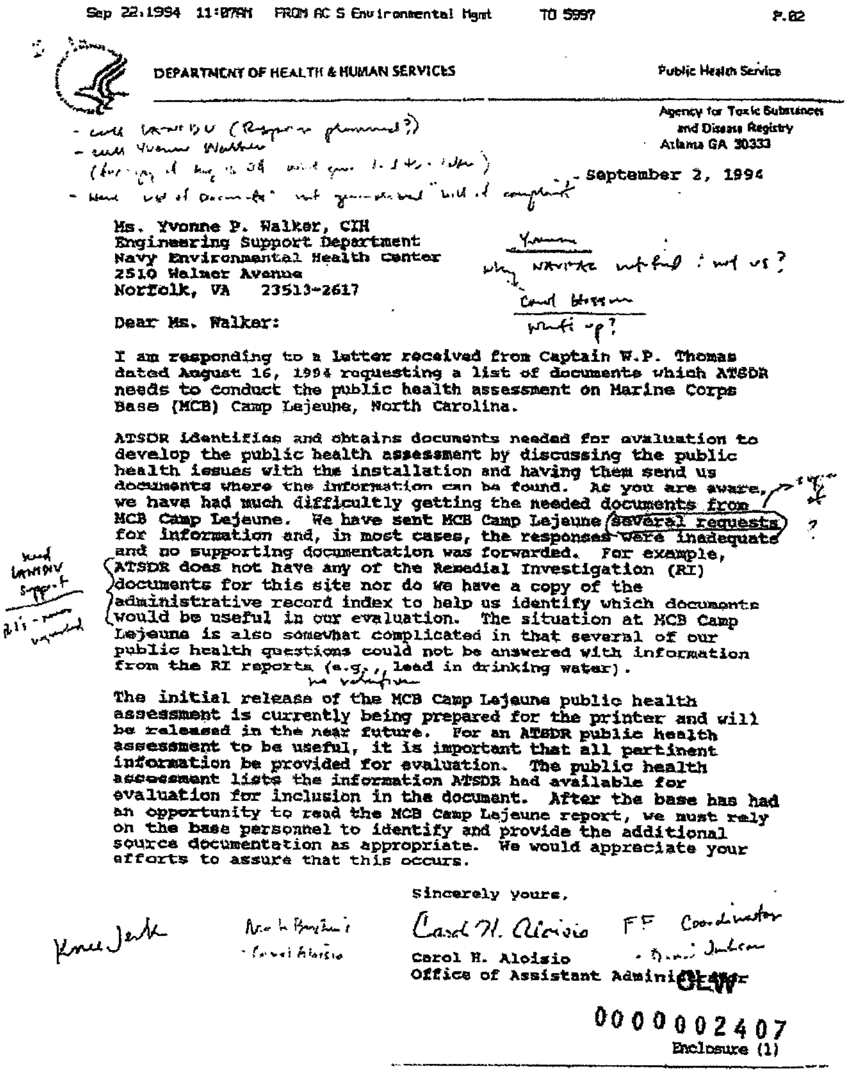
ANALYSIS DATE 2/8/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	400 ~~N.D.~~
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	18,900 ~~N.D.~~
30V 1,2-trans-dichloroethylene	7580 ~~N.D.~~	88V vinyl chloride	168* ~~N.D.~~

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* Below Method Detection Limit

Exhibit # 8



Sep 22,1994 11:07AM FROM AC S Environmental Mgmt TO 5997 P.02

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

- call [illegible] (Response planned?)
- call Yvonne Walker
(for [illegible])
- have [illegible] of documents [illegible]

September 2, 1994

Ms. Yvonne P. Walker, CIH
Engineering Support Department
Navy Environmental Health Center
2510 Walmer Avenue
Norfolk, VA 23513-2617

Yvonne
why NAVFAC not find : not us?
Carol [illegible]
what's up?

Dear Ms. Walker:

I am responding to a letter received from Captain W.P. Thomas dated August 16, 1994 requesting a list of documents which ATSDR needs to conduct the public health assessment on Marine Corps Base (MCB) Camp Lejeune, North Carolina.

ATSDR identifies and obtains documents needed for evaluation to develop the public health assessment by discussing the public health issues with the installation and having them send us documents where the information can be found. As you are aware, we have had much difficultly getting the needed documents from MCB Camp Lejeune. We have sent MCB Camp Lejeune several requests for information and, in most cases, the responses were inadequate and no supporting documentation was forwarded. For example, ATSDR does not have any of the Remedial Investigation (RI) documents for this site nor do we have a copy of the administrative record index to help us identify which documents would be useful in our evaluation. The situation at MCB Camp Lejeune is also somewhat complicated in that several of our public health questions could not be answered with information from the RI reports (e.g., lead in drinking water).

need LANTDIV support
RI's - never requested

The initial release of the MCB Camp Lejeune public health assessment is currently being prepared for the printer and will be released in the near future. For an ATSDR public health assessment to be useful, it is important that all pertinent information be provided for evaluation. The public health assessment lists the information ATSDR had available for evaluation for inclusion in the document. After the base has had an opportunity to read the MCB Camp Lejeune report, we must rely on the base personnel to identify and provide the additional source documentation as appropriate. We would appreciate your efforts to assure that this occurs.

Sincerely youre,

Carol H. Aloisio

Carol H. Aloisio
Office of Assistant Administrator

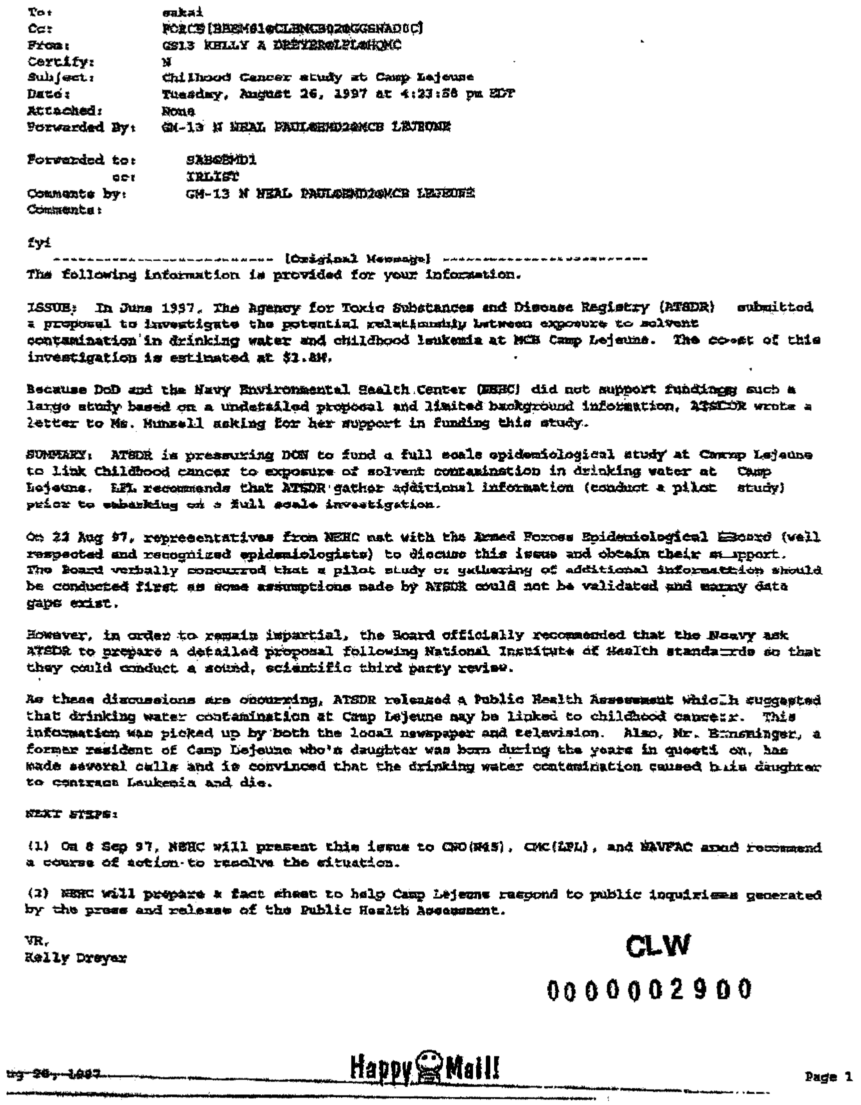
FF Coordinator

OEW

0000002407

Enclosure (1)

Exhibit # 9



To: sakai
Cc: FORCS(BBEM81@CLBNCB02@GGSNADOC)
From: GS13 KELLY A DREYER@LFL@HQMC
Certify: N
Subject: Childhood Cancer study at Camp Lejeune
Date: Tuesday, August 26, 1997 at 4:23:58 pm EDT
Attached: None
Forwarded By: GM-13 N NEAL PAUL@EMD2@MCB LEJEUNE

Forwarded to: SABG@EMD1
cc: IRLIST
Comments by: GM-13 N NEAL PAUL@EMD2@MCB LEJEUNE
Comments:

fyi

------------------------------ [Original Message] ------------------------------

The following information is provided for your information.

ISSUE: In June 1997, The Agency for Toxic Substances and Disease Registry (ATSDR) submitted a proposal to investigate the potential relationship between exposure to solvent contamination in drinking water and childhood leukemia at MCB Camp Lejeune. The cost of this investigation is estimated at $1.8M.

Because DoD and the Navy Environmental Health Center (NEHC) did not support funding such a large study based on a undetailed proposal and limited background information, ATSDR wrote a letter to Ms. Munsell asking for her support in funding this study.

SUMMARY: ATSDR is pressuring DON to fund a full scale epidemiological study at Camp Lejeune to link Childhood cancer to exposure of solvent contamination in drinking water at Camp Lejeune. LFL recommends that ATSDR gather additional information (conduct a pilot study) prior to embarking on a full scale investigation.

On 22 Aug 97, representatives from NEHC met with the Armed Forces Epidemiological Board (well respected and recognized epidemiologists) to discuss this issue and obtain their support. The Board verbally concurred that a pilot study or gathering of additional information should be conducted first as some assumptions made by ATSDR could not be validated and many data gaps exist.

However, in order to remain impartial, the Board officially recommended that the Navy ask ATSDR to prepare a detailed proposal following National Institute of Health standards so that they could conduct a sound, scientific third party review.

As these discussions are occurring, ATSDR released a Public Health Assessment which suggested that drinking water contamination at Camp Lejeune may be linked to childhood cancer. This information was picked up by both the local newspaper and television. Also, Mr. Ensminger, a former resident of Camp Lejeune who's daughter was born during the years in question, has made several calls and is convinced that the drinking water contamination caused his daughter to contract Leukemia and die.

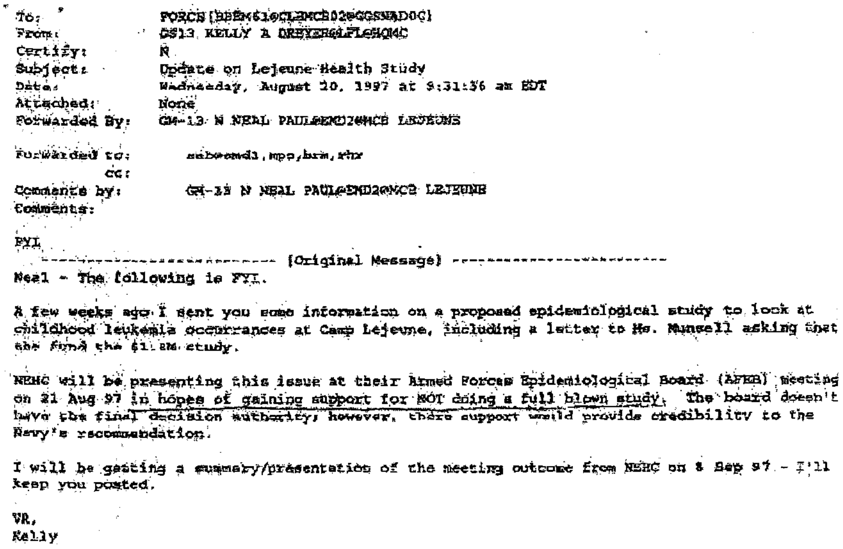
NEXT STEPS:

(1) On 8 Sep 97, NEHC will present this issue to CNO(N45), CMC(LFL), and NAVFAC and recommend a course of action to resolve the situation.

(2) NEHC will prepare a fact sheet to help Camp Lejeune respond to public inquiries generated by the press and release of the Public Health Assessment.

VR,
Kelly Dreyer

Exhibit # 10



To: FORCS [BBEM51@CLEMCB02@GGSNAD0C]
From: GS13 KELLY A DREYER@LFL@HQMC
Certify: N
Subject: Update on Lejeune Health Study
Date: Wednesday, August 20, 1997 at 9:31:36 am EDT
Attached: None
Forwarded By: GM-13 N NEAL PAUL@EMD2@MCB LEJEUNE

Forwarded to: asbeemd1,mpp,brm,rhr
cc:
Comments by: GM-13 N NEAL PAUL@EMD2@MCB LEJEUNE
Comments:

FYI

-------------------------- [Original Message] --------------------------

Neal - The following is FYI.

A few weeks ago I sent you some information on a proposed epidemiological study to look at childhood leukemia occurrances at Camp Lejeune, including a letter to Ms. Munsell asking that she fund the $1.2M study.

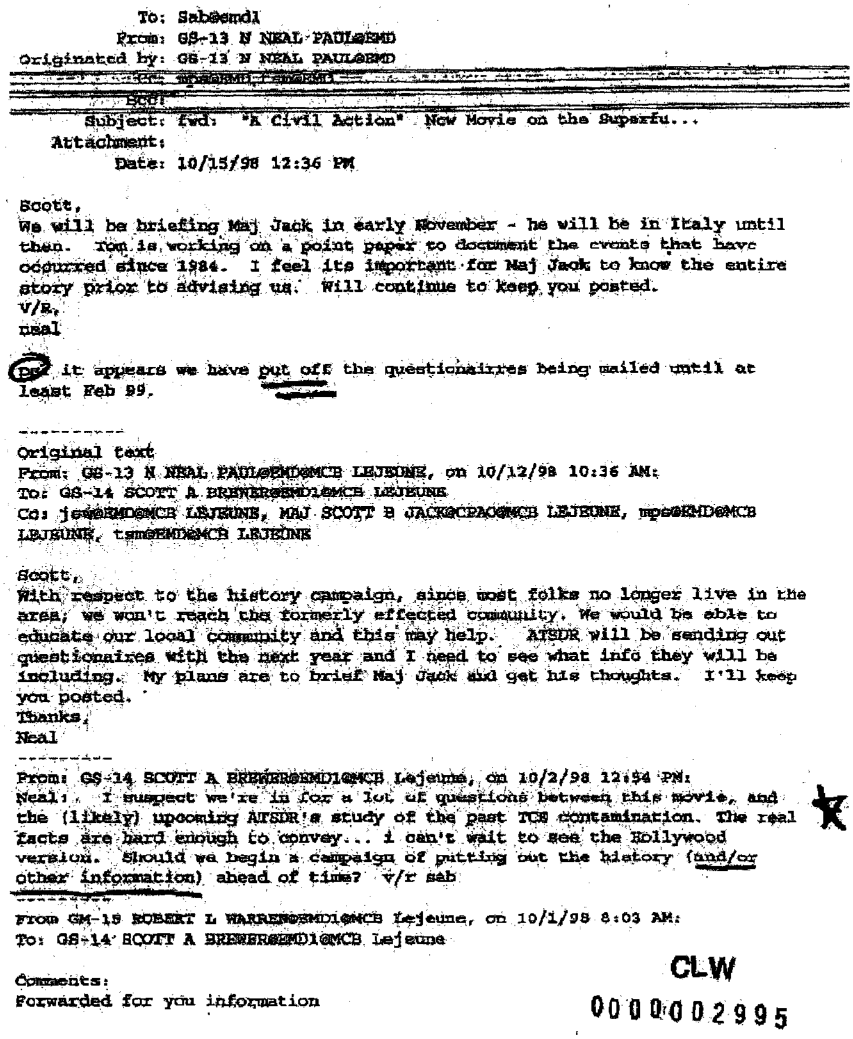
NEHC will be presenting this issue at their Armed Forces Epidemiological Board (AFEB) meeting on 21 Aug 97 in hopes of gaining support for NOT doing a full blown study. The board doesn't have the final decision authority; however, there support would provide credibility to the Navy's recommendation.

I will be getting a summary/presentation of the meeting outcome from NEHC on 8 Sep 97 - I'll keep you posted.

VR,
Kelly

Happy Mail!

Exhibit # 11



To: Sab@emd1
From: GS-13 N NEAL PAUL@EMD
Originated by: GS-13 N NEAL PAUL@EMD
[redacted]
Subject: fwd: "A Civil Action" New Movie on the Superfu...
Attachment:
Date: 10/15/98 12:36 PM

Scott,
We will be briefing Maj Jack in early November - he will be in Italy until then. Tom is working on a point paper to document the events that have occurred since 1984. I feel its important for Maj Jack to know the entire story prior to advising us. Will continue to keep you posted.
V/R,
neal

PS it appears we have put off the questionairres being mailed until at least Feb 99.

Original text
From: GS-13 N NEAL PAUL@EMD@MCB LEJEUNE, on 10/12/98 10:36 AM:
To: GS-14 SCOTT A BREWER@EMD1@MCB LEJEUNE
Cc: jsw@EMD@MCB LEJEUNE, MAJ SCOTT B JACK@CPAO@MCB LEJEUNE, mps@EMD@MCB LEJEUNE, tsm@EMD@MCB LEJEUNE

Scott,
With respect to the history campaign, since most folks no longer live in the area, we won't reach the formerly effected community. We would be able to educate our local community and this may help. ATSDR will be sending out questionaires with the next year and I need to see what info they will be including. My plans are to brief Maj Jack and get his thoughts. I'll keep you posted.
Thanks,
Neal

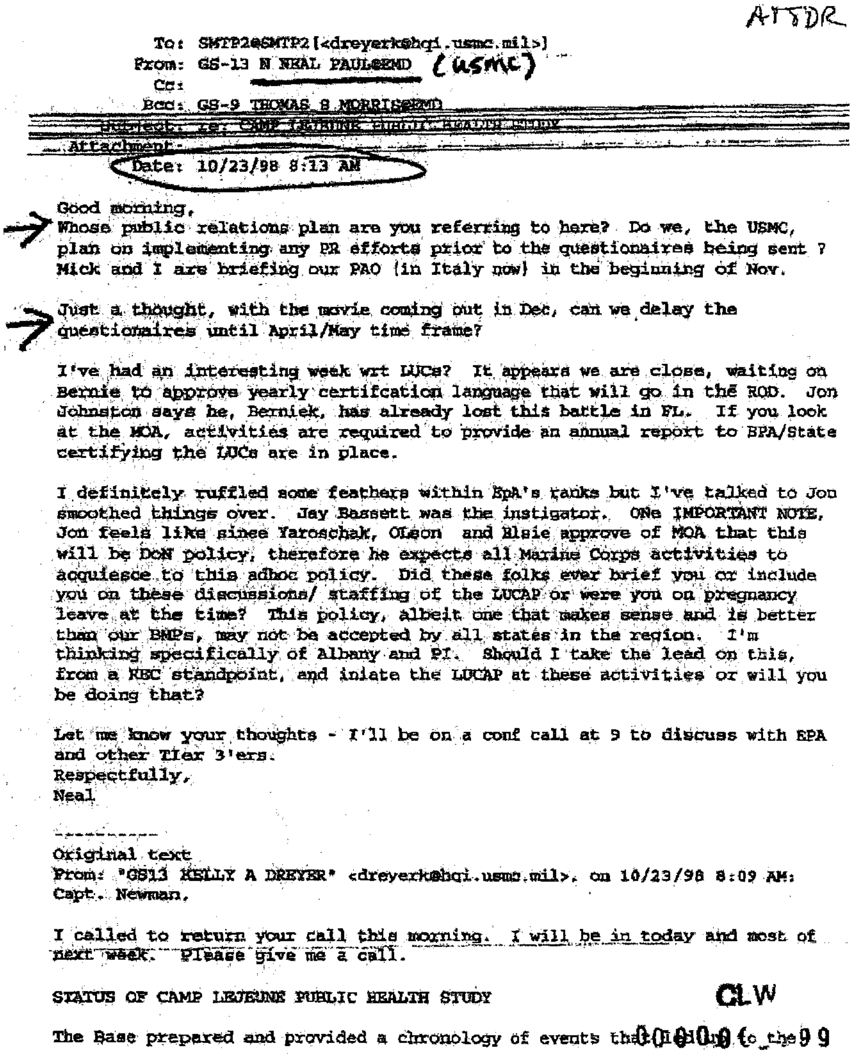
From: GS-14 SCOTT A BREWER@EMD1@MCB Lejeune, on 10/2/98 12:54 PM:
Neal: I suspect we're in for a lot of questions between this movie, and the (likely) upcoming ATSDR's study of the past TCE contamination. The real facts are hard enough to convey... i can't wait to see the Hollywood version. Should we begin a campaign of putting out the history (and/or other information) ahead of time? v/r sab

----

From GM-15 ROBERT L WARREN@EMD1@MCB Lejeune, on 10/1/98 8:03 AM:
To: GS-14 SCOTT A BREWER@EMD1@MCB Lejeune

Comments:
Forwarded for you information

Exhibit # 12



ATSDR

To: SMTP2@SMTP2[<dreyerk@hqi.usmc.mil>]
From: GS-13 N NEAL PAUL@EMD (USMC)
Cc:
Bcc: GS-9 THOMAS S MORRIS@EMD
~~Subject: Re: CAMP LEJEUNE PUBLIC HEALTH STUDY~~
~~Attachment:~~
Date: 10/23/98 8:13 AM

Good morning,
Whose public relations plan are you referring to here? Do we, the USMC, plan on implementing any PR efforts prior to the questionaires being sent ? Mick and I are briefing our PAO (in Italy now) in the beginning of Nov.

Just a thought, with the movie coming out in Dec, can we delay the questionaires until April/May time frame?

I've had an interesting week wrt LUCs? It appears we are close, waiting on Bernie to approve yearly certifcation language that will go in the ROD. Jon Johnston says he, Berniek, has already lost this battle in FL. If you look at the MOA, activities are required to provide an annual report to EPA/State certifying the LUCs are in place.

I definitely ruffled some feathers within EpA's ranks but I've talked to Jon smoothed things over. Jay Bassett was the instigator. ONe IMPORTANT NOTE, Jon feels like since Yaroschak, OLeon and Elsie approve of MOA that this will be DoN policy, therefore he expects all Marine Corps activities to acquiesce to this adhoc policy. Did these folks ever brief you or include you on these discussions/ staffing of the LUCAP or were you on pregnancy leave at the time? This policy, albeit one that makes sense and is better than our BMPs, may not be accepted by all states in the region. I'm thinking specifically of Albany and PI. Should I take the lead on this, from a REC standpoint, and iniate the LUCAP at these activities or will you be doing that?

Let me know your thoughts - I'll be on a conf call at 9 to discuss with EPA and other Tier 3'ers.
Respectfully,
Neal

Original text
From: "GS13 KELLY A DREYER" <dreyerk@hqi.usmc.mil>, on 10/23/98 8:09 AM:
Capt. Newman,

I called to return your call this morning. I will be in today and most of next week. Please give me a call.

STATUS OF CAMP LEJEUNE PUBLIC HEALTH STUDY

The Base prepared and provided a chronology of events that led up to the

Exhibit # 13

Sby/CL/HQMC/USMC@HQMC, "LTCOL=WALTER=W=SIMMONS%OLA%HQMC"@hqi.usmc.mil
cc: Craig K Sakai/LFL/HQMC/USMC@HQMC,
"GM15=KIM=G=WEIRICK%LFL%HQMC"@hqi.usmc.mil,
"COL=LAWRENCE=L=LARSON%LFL%HQMC"@hqi.usmc.mil,
olson.dave@hq.navy.mil, erik_k._godwin@omb.eop.gov

Subject: Camp Lejeune Health Study

Ladies and Gentlemen,

In support of the health study being conducted at MCB Camp Lejeune, I would like to schedule a meeting at Camp Lejeune in January 1999 to develop a public relations plan and implementation strategy. It is imperative that this plan be developed and implemented PRIOR to any surveys/questionnaires being distributed or telephone interviews taking place.

I envision this meeting lasting approximately 4-6 hours and ending with a plan and roles and responsibilities for each of the agencies involved.

Please email me your January availability so I can coordinate a date that is good for everyone.
I am available Jan 6-8, 19-22 and 25-29.

The following offices/agencies should be represented:

MCB Camp Lejeune - Environmental, Public Affairs, counsel housing, and others
Marine Corps Headquarters - Environmental Management, Public Affairs, Counsel, Legislative Affairs
Naval Facilities Engineering Command - Headquarters Risk Assessor,
Naval Facilities Engineering Command - Atlantic Division RPM
Navy Environmental Health Center
Agency for Toxic Substances and Disease Registry - Technical and Public Relations

If there are other offices that should be coordinated with, please let me know and I will include them.

After the holidays, I will be putting together a draft agenda for your review and input.

Respectfully,
Kelly Dreyer
(703) 695-8302, ext 3329

Exhibit # 14

Summary of Investigation

Marine Corps Base, Camp Lejeune

U.S. Environmental Protection Agency
Criminal Investigation Division

1. INTRODUCTION

1.1 Officials contributing to this summary.

The following individuals have participated in this investigation and contributed to this summary:

Special Agent
US Environmental Protection Agency
Criminal Investigation Division
Charlotte Resident Office

Senior Criminal Enforcement Specialist
US Environmental Protection Agency
Criminal Investigation Division
Atlanta Area Office

P.H.
Consultant, US Department of Justice
US Environmental Protection Agency, retired
Atlanta, GA

1.2 Format of this summary.

For approximately a year the EPA CID has conducted an investigation based upon numerous allegations that federal law was violated by individuals and entities connected with contaminated drinking water on Marine Corps Base, Camp Lejeune, (Camp Lejeune) beginning in the early 1980s through 2004. Based upon the evidence and information compiled in this investigation, the EPA CID has referred this case for prosecutorial input by the US Department of Justice.

During the course of this case, questions have been consistently posed to the investigators from various sources: members of congress, military and civilian witnesses, EPA management, and victims. As a result, the format of this summary reflects many of these questions with brief written responses. These questions and responses were determined to be the most relevant to this investigation and potential violations of federal law. This summary has been divided into two sections: an investigation into the actions of US Marine Corps (USMC) military and civilian employees at Camp Lejeune, and an investigation into actions taken by employees of the Agency for Toxic Substances and Disease Registry (ATSDR).

In addition to addressing criminal culpability, investigators also broadened the scope of their investigation to answer several questions particularly relevant to this case, but determined not to be violations of federal law.

Concurrent with this EPA CID investigation, the Commandant of the United States Marine Corps (USMC) issued a charter March 18, 2004, forming the Drinking Water Fact-Finding Panel for Camp Lejeune. This Panel completed an independent review of the facts surrounding the decisions made following the 1980 discovery of volatile organic compounds in drinking water at Camp Lejeune. This Report was provided to the Commandant and the EPA CID in early October 2004. This Report was reviewed during this investigation and copies were provided to the US DOJ to assist in their review of this investigation. Many of the same records, persons and concepts considered and interviewed by the Panel were also examined by the EPA CID. As a result, specific sections of the Panel's report are sometimes referred to in this summary. Further, during the course of this investigation, . spoke briefly with a contract investigator for the Panel on his findings. In this summary, details from a few subject interviews conducted by this investigator are referenced.

Finally, officials reading this summary will need to have an understanding of the details surrounding the contaminated drinking situation at MCB-CL and federal environmental regulations to properly access the information provided in this summary.

Attachments to this summary include:

TTHM Surveillance Report Forms for MCB-CL (4 Forms)
Grainger Laboratories Letter dated August 10, 1982

1.2.1 Investigation into the USMC.

The USMC maintains Marine Corps Base, Camp Lejeune (MCB-CL) in Jacksonville, NC. While this case initially targeted any component within the Marine Corps hierarchy with connection to the contaminated drinking water issue, further evaluation determined only three entities may be subject to criminal liability. The three entities are: the civilian employees within Camp Lejeune's Natural Resources and Environmental Affairs Division (NREAD); the direct military hierarchy to the NREAD, to include the Assistant Chief of Staff (AC/S) Facilities, the Chief of Staff and the Commanding General; and, the civilian employees of the Naval Facilities Engineering Command Atlantic Division (LANTDIV).

The principle allegations investigated in regard to the Navy and USMC were:

A. Violations of the Safe Drinking Water Act (SDWA),
B. Conspiracy to violate the SDWA,
C. Conspiracy to conceal records and prevent persons from talking with a federal agency conducting a congressionally mandated health study,
D. Conspiracy to conceal (FOIA) records from the public,
E. Providing material false statements to a federal law enforcement officer.

1.2.2 Investigation into the ATSDR.

Concurrent with the congressionally mandated health assessment for Camp Lejeune in 1997, the ATSDR began a series of public heath related assessments and studies to explore the potential link between contaminated drinking water and human health. Several investigators have lead the research with oversight by managers in the Division of Health Studies. During the course of their research, these lead investigators have entered into dialogue with members of the public connected with the contaminated drinking water matters at Camp Lejeune. It was through this dialogue that certain citizens learned of and alleged to investigators potential criminal misconduct within the agency, specifically the destruction of Agency records in violation of record retention policy. Further, these citizens alleged a failure by the ATSDR to properly address the contaminated drinking water matter at Camp Lejeune based upon influence from the Navy. Only employees within the Division of Health Studies with responsibility for Camp Lejeune were investigated for misconduct.

The principle allegations investigated in regard to the ATSDR were:

A. Destruction of a federal agency's records,

B. Conspiracy to improperly administer a congressionally mandated health study.

1.3 Why did the EPA CID open a criminal investigation?

In September of 2003, a series of factors contributed to the information considered prior to opening a criminal investigation. First, private citizens had contacted numerous government agencies (DOJ's Environmental Crimes Section in Washington, DC; US Attorney's Office in Raleigh, NC; the EPA's CID Headquarters in Washington, DC; and, the EPA CID Atlanta Area Office), alleging violations of federal law and requesting an investigation be conducted. Second, members of Congress had been contacted by many of the same private citizens, specifically the Offices of Senator Jim Jeffords (I-VT), Senator Elizabeth Dole (R-NC), Senator John Warner (R-VA), Congressman John Dingle (D-MI). Staffers from various congressional offices inquired with the EPA CID. Finally, print and television news reporters contacted the EPA CID to both inquire into the matter and provide information supporting potential federal violations.

1.3.1 Investigative Discretion.

The EPA Exercise of Investigative Discretion Memo (January 12, 1994) states,

"The criminal case selection process will be guided by two general measures - significant environmental harm and culpable conduct."

The threat of significant harm to the environment and human health was demonstrated by the actual release of industrial solvents into the groundwater by sources on Camp Lejeune and the off-base dry cleaner, ABC Cleaners. This reality has been long established by the EPA and culminated in Camp Lejeune being placed on the National Priorities List (NPL) in 1989. Further, the ATSDR had committed to a public health study investigating the ill health effects children that were exposed *in-utero* may have suffered from mothers that consumed contaminated drinking water.

The illegal conduct alleged by the private citizens concerned the concealment of records connected with the contaminated drinking water on the base by the USMC from the public and the ATSDR via its request(s) for data. Further, documents received by the citizens via Freedom of Information Act (FOIA) requests to the military, indicated Camp Lejeune officials had knowledge the drinking water on the base was contaminated and they failed to prevent it from being consumed.

In regard to employees at ATSDR, it was alleged that an order was made by a manager within the Division of Health Studies to a subordinate employee to destroy Agency case file records related to the Camp Lejeune health study. This allegation was considered to be deliberate misconduct by a public official.

Finally, this case initially exhibited six case factors EPA CID considers significant: serious government or government contractor misconduct, congressional interest or inquiry, serious public health threat, fatality or serious injury, national media issue, headquarters request.

1.4 Why has this investigation been referred to the DOJ?

The Department of Justice has forwarded several allegations from the public to the EPA CID since 2003, for investigation. This report addresses those allegations.

The EPA CID has investigated the allegation that the USMC and components thereof, have conspired to conceal data and prevent persons from exposing the details surrounding the discovery of volatile organic compounds (VOCs) in the drinking water of Camp Lejeune in the early 1980s. Investigators have been unable to substantiate that a conspiracy by military and/or civilian employees of the USMC exists.

The absence of substantive environmental violations has made this criminal investigation difficult. The absence of enforceable regulatory standards for both PCE and TCE between 1980 and 1985, provided no violation of the SDWA in this period of time related to these solvents. In this regard, even a statute of limitation is not relevant. However, the unique 25 year history, the complexity of this case, DOJ expertise and an evaluation of subject statements warrants prosecutorial input.

In regard to federal crimes committed by the ATSDR, prosecutors are asked to consider the circumstances surrounding

2. PRINCIPLE EVIDENCE CONSIDERED

An initial period of investigation and review was required to sort out and fully understand the numerous allegations and intricacies involved with investigating contaminated drinking water on a military base in the 1980s. In regard to Camp Lejeune, investigators eventually focused on the details, records, and persons connected to the TTHM sampling results generated by the US Army

Environmental Hygiene Agency in 1980-1981, and the Grainger Laboratories letter identifying the presence of TCE/PCE in 1982. The initial reaction to and decisions after having received these two sets of data by the military was investigated.

2.1 TTHM Surveillance Report Forms from the US Army Environmental Hygiene Agency

In 1974, Congress passed the Safe Drinking Water Act (SDWA) to address domestic drinking water supplies and the concern over organic chemicals and other pollutants. The SDWA was implemented in three phases, with phase one being the development of National Interim Primary Drinking Water Regulations (NIPDWR). These Interim regulations became effective on June 24, 1977, with amendments to follow. TCE and PCE were not among the contaminants included in these Interim regulations.

In the 1979 amendments the final regulations for the control of total trihalomethanes (TTHMs), which established an maximum contaminant level (MCL) in drinking water and provided for compliance and monitoring. This regulation required that certain water treatment systems begin mandatory monitoring of TTHMs by November 1982, and compliance with the MCL was required by November 1983. In preparation for TTHM compliance, the USMC began sampling its drinking water system in 1980. It would be this initial sampling by the USMC that led to the identification of volatile organic compounds (VOCs) in drinking water at Camp Lejeune.

In 1980, Camp Lejeune drinking water was extracted from approximately 100 individual groundwater wells, treated in eight treatment plants (Tarawa Terrace, Hadnot Point, Holcomb Boulevard, Courthouse Bay, Rifle Range, Onslow Beach, Montford Point, and New River), and provided to residents through a network of distribution pipes (See Panel's Report, Attachments H, I, K). These eight treatment/distribution systems were designed to operate independently, although several connections were provided in the event of emergency.

In October 1980, Camp Lejeune initiated voluntary TTHM sampling of the Hadnot Point and New River water distribution systems in anticipation of the November 1982 deadline. At this time, the Naval Facilities Engineering Command Atlantic Division (NAVFAC) served in an advisory role to Camp Lejeune and facilitated implementation of the SDWA compliance program at the base. LANTDIV arranged for the analysis of the water samples, which were performed by the US Army Environmental Hygiene Agency (USAEHA) laboratory in Fort McPherson, Georgia, and a private contractor, Jennings Laboratories. LANTDIV scheduled monthly sampling and analysis of the Hadnot Point and New River water distribution systems from October 1980 through December 1981. The objective of sampling the water systems at Camp Lejeune and other Marine Corps facilities was to evaluate TTHM levels prior to scheduled implementation of regulatory requirements.

On October 21, 1980, the Camp Lejeune conducted TTHM sampling of the Hadnot Point and New River water distribution systems. USAEHA laboratory personnel developed TTHM Surveillance Reports to record the TTHM analytical results, which were submitted to LANTDIV. The October 1980, December 1980, January 1981, and February 1981 TTHM Surveillance Reports indicated that water samples collected during these months were highly contaminated with chlorinated hydrocarbons that interfered with TTHM analyses. These results were the first indication that chlorinated hydrocarbons were present in the drinking water systems at Camp Lejeune. (Refer to US Army Environmental Hygiene Agency TTHM Surveillance Report Forms).

Both LANTDIV and Camp Lejeune received copies of these TTHM Surveillance Forms, which included hand written references to organic interferences. Neither staff at LANTDIV nor Camp Lejeune, specifically the Natural Resource and Environmental Affairs Division (NREAD), related these results and organic interferences to a source. Both the Panel and the EPA's investigators looked into the details surrounding these TTHM Surveillance Forms at both LANTDIV and Camp Lejeune. In order to put these details in context, both the Panel and the EPA's investigators also researched the regulatory framework, the standard industry water supply practices, and the level of expertise at LANTDIV and Camp Lejeune in 1980.

In regard to the staff of the NREAD, this investigation found that: the absence of regulatory standards; inconsistent sampling results attributable to a multi-well system; a lack of understanding of the operating parameters of the water distribution system; a compliance based approach to regulations; a lack of communication with military, federal, or state environmental and health agencies; and, the lack of expertise for toxicology and public health prevented the NREAD from properly addressing the organic interferences. The absence of enforceable regulations for the solvents found to cause the organic interference provided no violation of the SDWA. This investigation found no conspiracy by the staff of the NREAD to intentionally violate the SDWA or conceal any data related to the TTHM Surveillance Forms.

In regard to the staff of the LANTDIV this investigation found that: the absence of regulatory standards; a compliance based approach to regulations; a lack of communication with military, federal, or state environmental and health agencies; and, the level of expertise for toxicology and public health most likely prevented the LANTDIV from properly addressing the organic interferences. The absence of enforceable regulations for the solvents found to cause the organic interference provided no violation of the SDWA. This investigation found the staff of the LANTDIV was not forthcoming when questioned about the TTHM Surveillance Report Forms. It is not clear to what extent the LANTDIV addressed the organic interference issue in 1980-1981, since every LANTDIV employee interviewed denied knowledge of the interference issue.

2.2 Analyses of samples from Grainger Laboratories (August 10, 1982) for Tarawa Terrace and Hadnot Point

In February 1982, LANTDIV directed Camp Lejeune to begin TTHM monitoring using a laboratory certified by North Carolina. Camp Lejeune initiated sampling in April 1982, using Grainger Laboratories, which summarized in reports TTHM tests performed on samples taken at various points in the base's water supply system. No individual wells were sampled. Chemists at Grainger Laboratories directed these reports to the in the NREAD.

The base collected monthly samples from eight Camp Lejeune drinking water systems in April, May, June, and July 1982. Grainger contacted by phone on May 6, 1982 to inform her that interferences from chlorinated hydrocarbons were apparent during the analysis of water samples from the Tarawa Terrace and Hadnot Point water systems.

In July 1982, base personnel collected additional water samples from the Tarawa Terrace and Hadnot Point drinking water systems for analysis by Grainger to identify the suspected chlorinated hydrocarbons. At this time, Grainger also analyzed water samples it had retained from May 1982 TTHM sampling event to identify the specific chlorinated hydrocarbons detected in previous analyses. In August 1982, Camp Lejeune received analytical results that quantified TCE and PCE concentrations (Refer to Grainger Laboratories Letter - August 10, 1982). This letter from Grainger Labs was addressed to the Commanding General and was meant to get the attention of Camp Lejeune.

Like the organic interference issue, attempted to identify the source of the TCE and PCE concentrations indicated by Grainger. In regard to the staff of the NREAD, this investigation found that: the absence of regulatory standards; inconsistent sampling results attributable to a multi-well system; a compliance based approach to regulations; a lack of communication with military, federal, or state environmental and health agencies; and, the level of expertise for toxicology and public health prevented the NREAD from properly addressing the TCE/PCE contamination. However, with a clear indication solvents had contaminated drinking water systems on Camp Lejeune, and NREAD failed to properly investigate the contamination and determine the contamination was coming from individual groundwater wells. The absence of enforceable regulations for TCE and PCE provided no violation of the SDWA. This investigation found no conspiracy by the staff of the NREAD to intentionally violate the SDWA or conceal any data related to the Grainger Letter or TCE/PCE.

In regard to the staff of the LANTDIV, this investigation found that LANTDIV, as a technical advisory organization to Camp Lejeune, was not diligent in providing technical expertise to the NREAD. The absence of enforceable regulations for the solvents found to cause the organic interference provided no violation of the SDWA. As previously mentioned, this investigation found the staff of the LANTDIV was not forthcoming when questioned about the solvents identified in the 1982 Grainger Laboratories letter.

2.3 How the contaminated wells came to be shutdown.

The Navy Assessment and Control Installation Pollutants (NACIP) Program was initiated at Camp Lejeune in January 1982 with an Initial Assessment Study (IAS). During the IAS, 75 potential contaminated sites were identified at Camp Lejeune, and of those, 22 were considered priority sites that required further study. In July 1982, Camp Lejeune initiated the NACIP Confirmation Study. The Confirmation Study included the sampling of any community water supply well in the vicinity of a priority site, such as Hadnot Point. This was significant, as prior samples were drawn at the water treatment plants or in the distribution system, not from individual wells.

In November 1984, Camp Lejeune received results of the NACIP investigation that revealed areas of environmental contamination. Based on a direct association established between contamination in the Hadnot Point system and VOCs (TCE/PCE) detected in the drinking water wells, water system operators began shutting down contaminated wells in Hadnot Point in November.

In January 1985, NREAD recommended all drinking water wells be tested for VOCs. On February 8, 1985, two wells at Tarawa Terrace were closed in response to contamination detected in these wells.

The NACIP program had been designed to identify the existence of any pollutants on and in the vicinity of Camp Lejeune. It was NACIP program's sampling that identified the TCE/PCE contamination in the individual drinking wells that lead to their closure by base command. Absent this sampling in 1984-85, it is not clear the contaminated wells would have been eventually identified by the NREAD or LANTDIV.

3. INVESTIGATION INTO THE USMC

3.1 Why were the underground wells providing drinking water to Tarawa Terrace and Hadnot Point not tested for VOC's, like TCE/PCE, by Camp Lejeune following the publication of SNARLS by the EPA in 1979 and 1980?

A 1982 memorandum shows that in 1982, base personnel had a copy of EPA's SNARL for TCE, SNARL for PCE, and Suggested Action Guidance for PCE. These documents summarized the toxic properties, including cancer causing potential for humans, of each compound and provided safe, non-cancer levels for durations of exposure for as much as lifetime. While the SNARLS were not enforceable regulatory values, they informed the water supply industry, as well as State and local health authorities, of the potential dangers from drinking water containing TCE and/or PCE.

THE SUGGESTED NO ADVERSE RESPONSE LEVELS (SNARLS) FOR PCE AND TCE		
PERIOD	*PCE*	*TCE*
1-Day	2300 ppb	2000 ppb
10-Days	175 ppb	200 ppb
Chronic	20 ppb	75 ppb

At Camp Lejeune, the first (and only prior to late 1984) quantitative levels of TCE/PCE interferences were received by the NREAD in August 1982.

GRAINGER LABORATORIES RESULTS AUGUST 10, 1982		
LOCATION	*PCE*	*TCE*
Tarawa Terrace WTP	76 ppb	-
Tarawa Terrace WTP	82 ppb	-
Tarawa Terrace WTP	80 ppb	-
Tarawa Terrace WTP	104 ppb	-
Hadnot Point WTP	< 1	19 ppb
Hadnot Point WTP	< 1	21 ppb
Hadnot Point WTP	15	[redacted]
Hadnot Point WTP	1.0	No data

SUMMARY OF GRAINGER LAB SAMPLES
MAY 1982 TO SEPTEMBER 1983

MONTH	*LAB RESULT*	*COMMENTS*
May 1982	No interference noted	Telephone call about VOC's
July 1982	No interference noted	
[redacted]	[redacted]	[redacted]
September 1982	No interference noted	
October 1982	No interference noted	
December 1982	TCE/PCE interference noted	No quantitative levels
January 1983	No interference noted	
September 1983	TCE/PCE interference noted	No quantitative levels

Because Camp Lejeune was in compliance with TTHM regulations, it appears no additional sampling occurred from September 1983 until mid-1984, when the NACIP program began testing wells. Both and , NREAD, would agree that more targeted water sampling should have occurred.

On June 12, 1984, EPA proposed rules for Volatile Synthetic Organic Chemicals (VOC's) with proposed MCLs. The EPA did not pass enforceable regulations for TCE until 1989, and for PCE until 1991. The absence of enforceable regulations between 1980 and 1985, provides no federal SDWA violation. The contaminated wells were shutdown in late 1984 and early 1985.

The Panel concluded there were confounding factors that appeared to have hindered Camp Lejeune personnel from quickly recognizing the significance of the VOC contamination. Factors cited were: the absence of regulatory standards, no records of resident complaints about water quality, sampling errors, and inconsistent sampling results attributable to a multiple-well system that diluted or masked evidence of significant contamination from any one source.

Based upon interviews with NREAD employees, namely and he "inconsistent sampling" appears to have been foremost in their minds at the time. They were unable to reproduce high readings, but more importantly were never able to appropriately identify any potential sources (paint cans, sampling errors, asbestos piping) that caused the interference. For example, on May 27, 1982, the highest TCE reading (1,400 ppb) came from samples drawn from the Hadnot Point distribution system. However, three other samples drawn from the same distribution system (HP) in May averaged 20 ppb. In retrospect, it appears clear the multiple-well rotation system contributed to the inconsistent VOC sampling results or anomalies because the VOC concentration in the samples would fluctuate depending upon the wells that were in operation at the time. Until 1984, NREAD personnel never sampled individual wells, as opposed to finished drinking water at the water treatment plants. Self-admittedly, this was the most significant lapse in judgement.

During an interview with a former Camp Lejeune Head of Facilities, he suggested that a current parallel to the "organic interference issue" the NREAD faced in the 1980s, may be likened to MTBE. Methyl Tertiary Butyl Ether or MTBE has been used since 1979 to replace lead as an octane enhancer in vehicles. As more and more drinking water sources exhibit the presence of MTBE, there is great concern over the potential health risks for its consumption. MTBE is on the EPA's Contaminant Candidate List for which EPA considers setting standards. The fact that the regulatory and scientific community gradually set exposure standards or provide specific guidance to the drinking water community is like the growing knowledge base TCE and PCE experienced through the 1970s and 80s. Will we someday look back and ask why we even used MTBE and allowed people to consume any level of it? Today we enjoy the benefit of mass communication through the internet. and did not have this luxury in the early 1980s.

3.2 When was the first time VOCs were detected in any of the drinking water systems?

The TTHM Surveillance Report Forms received from the US Army Environmental Hygiene Agency in 1980-1981, appear to be the most significant indication of VOCs. Both the NREAD personnel and records corroborate this. There was one early sample in October 1980 by Jennings Lab that was a single composite of all drinking water systems to identify priority pollutants, which showed various VOCs at the detection level.

3.3 Why was no extensive sampling and analysis ordered when the US Army Hygiene Agency's TTHM's Surveillance Report Forms (1980) stated there was "heavy organic interference" and "you need to analyze for chlorinated organics by gc/ms?"

The NREAD did investigate the potential source(s) for the organic interference, but never linked it to contaminated wells. With the TTHM results for the most part in compliance and sporadic interferences, the NREAD appears to have been satisfied with monitoring the situation. The Panel also addressed this in 3.4 Detailed Findings #4-5, page 42.

The LANTDIV personnel generally acknowledge the USAEHA's TTHM Surveillance Report Forms, but not the comments specifying "organic interferences." LANTDIV personnel consistently steered away from admitting any knowledge of "organic interference" from solvents.

3.4 What was the technical expertise (analytical chemistry, toxicology, public health) of Camp Lejeune's Natural Resources and Environmental Affairs Division (NREAD) from 1980-1985?

The NREAD had education and experience in analytical chemistry, biology and forestry. The NREAD had acquired knowledge and were gaining experience in environmental regulation as it became pertinent. The NREAD maintained no staff employees with training or experience in toxicology or public health.

3.5 What was the technical expertise (analytical chemistry, toxicology, public health) of LANTDIV from 1980-1985?

LANTDIV maintained expertise and training in analytical chemistry, environmental engineering and environmental compliance and regulation. The training and experience at LANTDIV appears to have been better suited to recognise and address VOC contamination and the potential effect(s) on public health than NREAD. Both the NREAD and LANTDIV claimed knowledge and access to public health counterparts, but neither seemed to employ a regular working relationship.

3.5.1 What was LANTDIV's responsibility for directing regulatory compliance and environmental leadership at USMC installations in the 1980s?

LANTDIV personnel consistently stated they only "advised" Camp Lejeune on regulatory issues. According to LANTDIV, they maintained no enforcement authority by design. Both LANTDIV and Camp Lejeune appeared to be regulatory driven, concentrating all efforts on legal compliance with the existing regulations.

While LANTDIV personnel insist they maintained strictly an advisory role, the employees at Camp Lejeune that worked with LANTDIV, such as NREAD employees, looked to LANTDIV for expert analysis and direction. In the early 1980s, any verbal or written suggestions or directives by

LANTDIV were interpreted by Camp Lejeune employees to be in essence orders. This investigation revealed a disconnect between the way in which LANTDIV and Camp Lejeune viewed LANTDIV's responsibility for directing regulatory compliance and environmental leadership. Based upon the educational background of its employees and the apparent oversight responsibility within the Navy structure, the LANTDIV appears to have been designed to direct regulatory compliance and environmental leadership.

3.6 Did Camp Lejeune officials provide residents with drinking water at a level of treatment consistent with general utility practices of 1980-1985?

Science and regulatory history

The first organic substances in drinking water to be regulated under the Safe Drinking Water Act of 1974 were six pesticides and herbicides. The major concern was carcinogenic contaminants found in surface water sources of drinking water supplies. Research on carcinogenic chemicals during this period included volatile organic chemicals (VOCs) initially of concern relative to inhalation exposure in occupational settings. The National Cancer Institute published in 1976 its finding of trichloroethylene (TCE) and tetrachloroethylene (PCE) carcinogenicity in animal models. In 1977, the National Research Council (NRC) of the National Academy of Sciences began the publishing of a series of reports on Drinking Water and Health. In 1980 under the Clean Water Act, the U.S. Environmental Protection Agency (EPA) developed Water Quality Criteria Documents for 64 toxic pollutants. The criteria were developed as guidance for states in developing surface water quality standards. The NRC Reports and the Criteria Documents included information on currently available chronic toxicity data (mostly animal cancer data) for TCE and PCE and other VOCs.

The emerging toxicity data on organic chemicals in water prompted a number of surveys of their occurrence in drinking water supplies. At the federal level, the National Reconnaissance Survey was conducted in 1975 and the National Organics Monitoring Survey in 1978. Many states conducted more intense surveys of supplies within their borders. Organics including VOCs were detected in many surface and ground water supplies. During this period of the 1970s, the EPA began the process of data gathering and regulating a broad range of organic substances including many VOCs in drinking water. The first VOC regulation in drinking water promulgated in November, 1979 established a maximum contaminant level (MCL) for total trihalomethanes. Most of the contaminant levels of the four chemicals that comprised the total trihalomethanes are created within the water treatment plant by the chlorination process. Regulation of VOCs present in the source waters began in March, 1982 with the Federal Register publication of an Advanced Notice of Proposed Rule Making for eight VOCs in drinking water. Proposed regulatory limits for TCE and PCE were published in 1984 and the final limits were promulgated in 1987 for TCE and in 1991 for PCE. Prior to the publication of the regulatory documents, EPA had released non-regulatory Suggested No Adverse Response Levels (SNARLS) for TCE in 1979 and PCE in 1980. These SNARLS were to serve as guidance on protective levels for non–carcinogenic risks from drinking water exposure extrapolated from inhalation studies in animal models. At some point prior to 1984, the California Department of Health Services set action levels for TCE and PCE in drinking water at the lowest level discussed in EPA's SNARL documents, i.e., 5 ppb and 4 ppb, respectively. Subsequent non-regulatory guidance from EPA's Office of Drinking Water included 1987 Health Advisories for TCE and for PCE. These documents provided information regarding then current information on their toxic properties and safe levels in drinking water.

Drinking water treatment practice

Basic components of municipal water treatment came into use in this country around the turn of the 20th century. River water was the source of drinking water for most large U.S. cities. These source waters often contained bacterial pathogens in high numbers from raw sewage, packing houses and other sources. Waterborne infectious disease was common rising to epidemic level from time to time. Processes to reduce the turbidity of source water were introduced around 1905 and chlorination was introduced soon afterward. Both water treatment processes yielded remarkable reductions in waterborne disease. From this beginning, the approach of current conventional water treatment practiced by most municipal systems that utilize surface water sources has changed very little. Particulate matter in water may contain embedded microorganisms or surface-attached organisms that can cause disease. The organic particulate matter may also interfere with the disinfecting capability of chlorine. Therefore, efficient and effective removal of particulate matter is a major objective of water treatment. Research in this area has yielded products that improve the clarification process and effective disinfection. However, the five steps of conventional water treatment for surface water remain the same: coagulation → flocculation → sedimentation→ clarification (filtration)→ disinfection.

Ground water sources of drinking water are not normally subjected to conventional treatment. The natural filtration process of ground water flow typically produces water of low turbidity, well within the turbidity standard. In addition, the typical deep-well source of groundwater has been believed to be generally free of toxic organic substances found in surface water. Disinfection for microbiological protection during distribution is often the only treatment. A lime softening step may be added for "hard" water. Sand filtration may be added when a more particle-free water is desired for esthetic reasons.

With improved analytical methods applied to water samples collected during federal and state surveys in the 1970s, a class of contaminant in "finished" water produced by surface and ground water treatment processes was observed. Synthetic volatile organic substances that are soluble in water had not been effectively removed. The frequency of TCE or PCE positive findings in the state and federal surveys ranged from 14 to 28% with most positive findings occurring in the northeastern states. When these findings were first observed, federal or state standards had not been established for VOCs in drinking water. Water providers were in a quandary as to the appropriate public health response to this newly-observed, generally low-level contamination.

Water treatment industry's response to VOC contamination

The American Water Works Association (AWWA) was founded in 1881 and is the largest organization of water supply professionals in the world. The association conducts training seminars, holds an annual meeting and produces a monthly journal. The journal publishes technical articles on drinking water issues from plant operation to cutting edge research as well as editorials from professional, regulatory and political leaders. It is "must reading" for anyone wishing to stay abreast of drinking water issues. Each issue contains articles in a Research and Technology section. Synthetic volatile organic contaminants were a frequent topic of these articles since conventional treatment practice was not effective in their removal and their presence in water had not been uniformly addressed by the regulatory and public health community. Problem assessment, individual plant experience and research results were frequent topics of journal articles.

Research on VOC removal from drinking water had indicated two approaches may be effective: (1) air stripping which transferred the volatile contaminant from water to air, and (2) adsorbing the volatile contaminants onto a matrix that was also a filter or could be subsequently filtered from the water. Activated carbon either granular or powdered was reported to be the most practical absorbent. In 1978, the JAWWA published an article by the EPA Office of Drinking Water proposing a two part regulatory approach for VOCs, i.e., an MCL for total trihalomethanes and a granular activated carbon (GAC) treatment requirement to address all other synthetic organics contaminants. The GAC requirement approach was strongly attacked in a February, 1979 article in the JAWWA by the Coalition for Safe Drinking water, a coalition of 90 water utilities in the U. S. They preferred the development of an individual MCL for each contaminant as *health data became available*. Activated carbon had been used for many years by utilities on an as-needed basis to control taste and odor issues, usually an algal gloom problem. The coalition stated that no water system in the world is known to have used GAC treatment for "EPA's design criteria" and that the use of GAC for taste and odor control had little bearing on its efficacy to control organics. Ultimately, the EPA used the MCL approach to the regulation of individual VOCs in water.

Much of the debate over the use of GAC for control of organics in drinking water took place in the out reach products of AWWA. GAC for organics was a major theme at the 1978 annual meeting of AWWA. At issue were the added cost of this treatment step, effectiveness, quality control and practical operation aspects and adequate sources of activated carbon. Necessity demanded a solution and major problems and issues have been resolved to the end that GAC use for organic removal has become a standardized treatment step in many municipal systems that have a known low-quality water source. Air strippers have also been used but usually for smaller ground water systems where VOC contamination is known and uncontaminated sources are not available. It has also been used as a remedial measure for contaminated aquifers. A significant disadvantage of this approach is the public health and regulatory concerns over ambient air transfer of the contaminants.

The heightened institutional concern for VOC contamination of drinking water derived from surface sources was not immediately applied to ground water. Articles on organic contamination of ground water had appeared in JAWWA from time to time in 1980 and 1981 publications. For example, an April, 1981 article in the Research and Technology section assessed the problem of TCE and methyl chloroform in ground water and stated that "groundwater pollution remains a problem of immense importance and only recently have methods been developed to help decontaminate polluted wells." However, it was not until August 1982, that AWWA dedicated an issue of its journal to organic contamination of ground water. This issue of the Journal included articles on the closing of private and municipal wells in California and Pennsylvania due to TCE contamination. It reported state and federal survey results that found TCE and PCE to be the most frequent organic contaminant in a high percentage of the wells surveyed. Articles discussed a 1981 paper by the White House Council on Environmental Quality titled Contamination of Ground Water by Toxic Organic Chemicals and an article on EPA's 1980 Proposed Ground Water Protection Strategy. Concern was building even though changes needed to address the issue generally awaited a regulatory requirement.

Water treatment practice at Camp Lejeune

The 2004 report of the Drinking Water Fact-Finding Panel for Camp Lejeune shows the water treatment process for drinking water produced at the Hadnot Point and Holcomb Boulevard treatment plants as follows: pre-chlorination → storage → lime softening → filtration → fluoridation → storage → distribution. This process was typical of ground water treatment during this period and more rigorous than many with the inclusion of a filtration step. No specific information was available on the filtration medium but the assumption is made that it was a rapid sand filtration system typical used in the treatment of surface water sources. The industry generally recognized by the early 1980s that this treatment process would not remove synthetic volatile organic contaminants. Surveys had found that such contaminants were present in a limited number of municipal ground water supplies around the country-- generally at part-per-billion levels. The health implication of this contamination was unclear as was an appropriate treatment method to remove the contaminants. The research data to address both issues were limited, uncertain and controversial during the late-1970s-early-1980s time frame. In addition, no state or federal regulatory limits had been established.

If optimally operated, these two Camp Lejeune water treatment systems would be considered appropriate and adequate in the early 1980s for producing a safe "in compliance" drinking water from deep ground water sources. More aggressive systems would have been aware of the published findings of current treatment failure to remove volatile organic contaminants, of survey information on VOC occurrence, and of the increasing interest in their health implications. Such systems may have sampled each of their supply wells for VOC contamination since migration of contaminants from nearby sources to deep wells had been reported for other locations. However, to pursue VOC contamination in the absence of regulatory safe levels could require the addressing of difficult cost and public relations issues. The water industry had presented only three remedial options -- (1) abandon the contaminated wells, (2) air strip the contaminants or (3) add a granular activated carbon treatment step with intense monitoring to determine effectiveness. Camp Lejeune assumed from its compliance record that it was distributing a safe drinking water and did not pursue actions that may have brought that assumption into question. They were joined in this assumption by many water utilities around the country who awaited new regulations to spur them into action as did the 1979 trihalomethane regulation. However, one interesting fact must be noted. The ultimate decision by Camp Lejeune leadership to close 10 contaminated wells in 1984 and 1985 was made in the absence of MCLs or other regulations for the primary contaminants—TCE and PCE.

Also reference Panel's 3.4 Detailed Findings #1-2, page 40.

3.7 Did Camp Lejeune officials comply with existing water quality regulations between 1974-1985?

Drinking water provided by Camp Lejeune appears to have met all state and federal regulatory requirements in place during the 1980-85 time period. Drinking water regulations had been established for only a few *organic* substances, i.e. six pesticides (1976) and trihalomethanes (1979). Initial drinking water regulations (MCLs) for volatile organic chemicals (VOCs) including trichloroethylene were published in 1987. An MCL for tetrachloroethylene was promulgated in 1991.

Also see Panel's 3.4 Detailed Findings #1-2, page 40.

3.8 Did Camp Lejeune officials contact the State of North Carolina Water Quality Control Section or EPA when VOCs were detected in 1980-1982?

No. While the State maintained no enforceable standards and the EPA had only released SNARLs as guidance, no officials at Camp Lejeune recalled having sought guidance from the regulatory agencies to help interpret the organic interferences and presence of solvents.

3.9 Why did Camp Lejeune officials fail to immediately shutdown wells used for drinking water when they were notified explicitly of contamination due to VOC's by Grainger Laboratories in 1982?

Similar to 3.1. The NREAD failed to recognize the groundwater wells were the source of contamination. As noted previously, this was arguably the greatest lapse in judgement.

3.9.1 How did Camp Lejeune handle the Grainger Letter (1982) upon receipt?

The best explanation of how a letter mailed to the Commanding General dealing with environmental issues was explained by stated this letter would have been routed through his office to NREAD and not read until that point. expectation was the NREAD would have addressed environmental concerns or recommendations backup through the chain of command.

3.10 The USMC Water Survey Chronology of Events (April, 1983) states, "Initial assessment study for Camp Lejeune is published and concludes that while none of the sites posed an immediate threat to human health or the environment, further investigation is warranted.." In light of the Grainger letter (1982), how can this be said?

To understand how this statement could have been made in 1983 it is necessary to look at how the water interference issue was being addressed and how the preliminary assessment was conducted. It appears that the two issues were being addressed by different groups and by different methods. The organic contamination of the drinking water was being addressed by base staff from NREAD and base utilities. They were looking backward from the finished drinking water to find the source of contamination. Initially their focus was on other possibilities than the supply wells. The Initial Assessment Study, which was lead by LANTDIV, was an effort to find disposal and contaminated sites on the base that could have an adverse effect on human health or the environment Most of the actual work was done by a contractor. The Initial Assessment Study is primarily a records search combined with visual assessment of the sites. It normally does not involve any sampling but will identify sites to be further investigated. It is unlikely, giving LANTDIV's denial of knowledge of the that the contractor who prepared the Initial Assessment ever saw the letter.

3.11 Was the Naval Facilities Engineering Command Atlantic Division (LANTDIV) aware of the drinking water samples revealing the presence of TCE and PCE prior to the NACIP related analyses generated in 1984?

The LANTDIV personnel generally acknowledge the USAEHA's TTHM Surveillance Report Forms, but not the comments specifying "organic interferences." LANTDIV personnel consistently steered away from admitting any knowledge of "organic interferences" from solvents. As noted in the subject write-up, the expectation(s) of the Navy's Shore Establishment, which incorporates LANTDIV, can most appropriately determine the degree to which LANTDIV failed to provide leadership and communication with installations like Camp Lejeune on environmental issues.

3.11.1 To what extent did LANTDIV address the TTHM report forms?

LANTDIV received the reports and most likely reviewed them for their compliance with TTHM regulations. There appears to be no effort or record of any attempt to address the VOC contamination issue.

3.12 To what extent was either the Preventive Medicine Unit on MCB-CL or any component within the Navy's Bureau of Medicine and Surgery advised or involved in addressing the presence of VOC's in drinking water samples?

No formal request was made based upon review of the administrative record or interviews. The few instances NREAD employees discussed the presence of solvents with members of the PMU, it appears to have been with the field side of the Unit. This field side of the PMU was made of health technicians assigned to deployed battalions, brigades, or regiments. The health technicians were concerned with more common health threats such as STDs, bacterial contamination, and good sanitation practices. A second group within the PMU was housed in the naval hospital with a greater degree of expertise and education. This staff appears to have been most qualified to have addressed the public health aspect of VOC contaminated drinking water in the early 1980s. Investigators were unable to develop any evidence this group was contacted concerning the ground water contamination.

3.12.1 Did the PMU receive the Grainger letter?

The specific routing of the Grainger letter was never determined.

3.13 How were the residents of Tarawa Terrace and Hadnot Point drinking water systems notified of the contaminated wells in 1984?

This issue was not considered in this investigation because it was not related to a crime. See Panel's 3.3.3.3 USMC Public Communications Regarding Hadnot Point and Tarawa Terrace Water

Systems (1980-1985).

3.14 Is Base Commander MajGen. Buehl's letter (April 30, 1985) where he characterizes the contaminated water system as "minute (trace) amounts" accurate?

The use of the term "minute (trace)" involves semantics that avoids the issue of what amounts of the substance may be harmful. A "trace" is generally defined as a very small amount of a substance, perhaps too small an amount to be measured. It is true that parts-per-billion (ppb) is a very small amount relatively speaking. However, such low levels of many hazardous substances in water can be measured and may pose a health risk. Many volatile chemicals in water including TCE and PCE can be measured at the 5 to 10 ppb range. Levels of PCE in wells supplying the Tarawa Terrace area had repeatedly shown high double digit ppb levels with a peak level of 1580 ppb prior to the date of MajGen Buehl's letter.

3.15 Has the USMC cooperated with this investigation?

The USMC has cooperated fully with EPA CID's investigation. The USMC HQ and Camp Lejeune have provided complete and timely responses to all requests. An example of the depth of cooperation by the USMC occurred after a meeting at the US Attorney's Office, Raleigh, NC, in April of 2004, with the Navy's Eastern Area Counsel Office and Counsel to the USMC Commandant, when they consented to providing their privileged document file to EPA.

In regard to any of the Naval and Marine Corps components approached in this investigation, the biggest area of concern were the seemingly rehearsed statements provided by the personnel at LANTDIV.

3.16 Has there been a conspiracy by USMC Officials to conceal records and prevent persons connected with contaminated drinking water on Camp Lejeune from cooperating?

This investigation has not substantiated an ongoing conspiracy in this case.

In regard to the civilian employees within MCB-CL's Natural Resources and Environmental Affairs Division (NREAD), these employees were for the most part honest and forthcoming. None of these employees claimed or believed there was an underlying conspiracy by the USMC to conceal the information related to the drinking water in the 1980-1985, nor when the ATSDR began investigating the matter in the 1990s.

In regard to the direct military hierarchy to the NREAD, there were never clear and distinct allegations or evidence implicating one or more of these officers. The reality that there were several supervisory positions over the NREAD coupled with the consistent turnover in these positions made the likelihood of a systemic, years long conspiracy unlikely.

In regard to the civilian employees of the Naval Facilities Engineering Command Atlantic Division (LANTDIV), there is concern by investigators that these employees have not been completely forthcoming in their interviews. However, on the issue of concealing records in a conspiracy, there was never indication LANTDIV took steps to conceal their administrative record nor prevent their people from talking with investigators. The greatest concern lay in the fact that investigators found LANTDIV personnel to have been coached. There was never any direct evidence that allowed investigators to pierce through LANTDIV employee claims that they were not aware of the VOC contamination prior to 1984.

3.18 What is the assessment of the Report furnished by the Drinking Water

Fact-Finding Panel for Camp Lejeune?

The eight Report findings accurate reflect the information presented in the text and are consistent with the findings of DOJ's expert witness hired to participate in interviews and to review the Administrative Record and other documents.

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4. INVESTIGATION INTO THE ATSDR

4.1 Is the rate of childhood cancers and birth defects from 1968-1985 significantly higher than the national average?

The national average childhood (1-19 yrs old) cancer incidence rate is about 17 per 100,000 with a mortality rate of about 2.5 per 100,000. The rate for a major birth defect is about 3,600 per 100,000. The ATSDR study seeks to determine if the rate of selected cancer and birth defect types are elevated in children and if they are associated with the mother's consumption of Camp Lejeune drinking water contaminated with VOCs. The answer to this question must await the outcome of the full epidemiological study.

4.2 Why was the water modeling data initially used by in dissertation flawed?

When ATSDR began their health study in 1996, they requested the water modeling data for the Camp Lejeune water distribution systems. Camp Lejeune provided the water modeling data apparently for the 1972 through 1985. ATSDR would later receive health data for a study population residing on Camp Lejeune from 1968 through 1985. When ATSDR went to match the water modeling data to the health data, the ATSDR appeared to have extrapolated the water

modeling for the 1972-1985 time frame, back to 1968. The problem with this having been done was the water modeling for Camp Lejeune was different between 1968 and 1972. This discrepancy was identified by a private citizen in 2003. The current ATSDR health study incorporates the correct water modeling.

Related to this issue was the length of time Camp Lejeune took to get ATSDR the correct water modeling for the 1968-1985 time frame when it was identified in 2003. It appears to have taken close to six months and several communications to Camp Lejeune for the water modeling diagrams to make there way to ATSDR. However, the preparation and format of the piping diagrams would have taken sometime to prepare.

4.3 Did the "Revised" Interim Progress Report, originally completed by (October 2002), exclude appropriate facts/data? Why was this Report not released until July 2003?

A September, 2002 version of the Interim Report of the case survey authored by apparently failed peer review. An apparent unchanged version dated October, 2002 was final draft. This draft was scientifically unacceptable to ATSDR managers and after considerable unsuccessful discussion with the task of redrafting the report was given to another lead investigator at ATSDR. The redrafting and response to peer review was completed in the first half of 2003. Significant changes in the redrafted "progress report" included the deletion of some information, e.g. a literature review section and a comparison with regional reference data, and the updating of case numbers from the ongoing investigation. The text was extensively rewritten, however, the conclusion that a full epidemiological study should proceed did not change expressed an opinion in an October 16, 2003 interview that the progress report had two potentially significant omissions, i.e. (1) there was no reference to the similar Woburn study and (2) the incidence of cardiac problems was not addressed. Upon investigation, these concerns were not born out and seemed to have withdrawn concerns in a September 13, 2004 interview. The final Progress Report was released in July, 2003.

4.4 Has the USMC or any Navy component influenced the ATSDR?

The USMC has supplied the essential data and information required by ATSDR to undertake their health assessments and studies. Investigators have not identified any instances when data was intentionally withheld or false data was provided.

Quarterly meetings were held between the ATSDR and representatives of the Navy through the course of the study. Based upon interviews with ATSDR, this appeared to never influenced their scientific work. While delays on the receipt of data was evident in this case, a current senior lead investigator for the ATSDR has assessed the Camp Lejeune delays as routine hurdles found in most ATSDR studies.

4.4.1 USMC funding for study.

A modification in the long-standing Memorandum of Understanding (MOU) between The Agency for Toxic Substances and Disease Registry (ATSDR) and the Department of Defense (DOD) extended the project period to December 31, 2004. Among other responsibilities of ATSDR, this MOU provides for the Agency's conducting of public health assessments and other related health activities at DOD installations and facilities. Pursuant to this MOU, a 1993 three-year plan showed the USMC Camp Lejeune Military Reservation as one of 30 DOD sites to receive a public health assessment. The MOU provided for DOD's execution of funding for work performed by ATSDR pursuant to this agreement. The sources of DOD funds provided to ATSDR are to be the Defense Environmental Restoration Account and the Base Closure Accounts. The MOU also allows the transfer of DOD personnel to ATSDR as necessary to carry out provisions of this agreement. ATSDR has received DOD funds for the health survey and health studies at Camp Lejeune but the total amount and specific aspects have not been made available to EPA investigators. However, a ATSDR researcher stated in an interview that in 2000 the Marine Corps had dedicated $4 million for the health survey. This person also stated that the projected $2-3 million for the current children health study would likely be provided by the Marine Corps and perhaps other government sources.

DOD funding of the health survey was apparently delayed because of outspoken opposition to the study by a mid-level manager in the Navy's Environmental Health Center. This opposition has been characterized as a professional difference of opinion as to the scientific value of the study in obtaining conclusive findings. Coupled with this internal debate was confusion with the Naval hierarchy on who was responsible for the contaminated wells. This appears to have contributed to the perception by the public and ATSDR that the Navy was denying any responsibility to avoid any potential litigation. Subsequently, key personnel in the USMC supported the study and provided funding.

4.4.2 USMC records and data provided to ATSDR.

The epidemiological study to be conducted by ATSDR required the contacting of the military residents of Camp Lejeune during the study period. The personnel records of former Camp Lejeune residents were maintained by the Defense Manpower Data Center. Initially, these records were not made available to ATSDR because they did not meet any exceptions required for release of information under the Privacy Act. Subsequently the DOD Privacy Act regulations in place were amended in a Federal Register notice to allow Department of Health and Human Service personnel access while conducting health studies. Once these legal issues were resolved the records were provided. Every civilian or military employee of the USMC believes the Corps has and will continue to fully support the ATSDR study.

Based upon discussions with USMC officials, the USMC appears to not have truly recognized the complexity and degree of attention this issue required in 1997. Prior to 1997, the USMC self admittedly failed to adequately address concerns and data requests from the public and ATSDR. This type of issue has to be managed and coordinated well. This was not done early on and appears to have contributed to more confusion, suspicion and concern on behalf of the retired Marines. The USMC officials said this was unfortunate, regrettable and something the Navy and USMC should have done better.

4.5 Has the USMC concealed records from ATSDR?

The issue of concealment appears to have consistently been tied to delays the ATSDR experienced after having requested documents from the USMC. Investigators have not identified any instances when data or records was intentionally withheld or false data was provided.

4.6 Was ordered by supervisor destroy ATSDR records connected with the MCB-CL study?

In December 2002, was preparing to leave the Division of Heath Studies and position as the on the Camp Lejeune study. In preparation for this departure and while cleaning out office returned records to the official Camp Lejeune file and organized records to be taken with At this time, maintained concern over what records was retaining and began more closely supervising the records was going to take with

approached regarding what should do with sets of telephone log books had used to record names, numbers, and medical information from the public that had contacted her over the years. While it is not clear gave a direct order to destroy these records, it is clear fully expected and specifically advised not to take any

Camp Lejeune records from the Division of Health Studies. never denied may have told to destroy the records. stated the detailed information collected by in these telephone log books was not necessary nor scientifically relevant to the study said the information from the Camp Lejeune families was important, but it just should not have been collected and documented in the informal way did it. As a result, believed the records were sensitive, since they contained personal medical information, and should not go outside the Division of Heath Studies. could not recall specifically what said to in December 2002, but would have been fine with the records having been either shredded or put in the official file.

Based upon an interview with the Division of Health Studies, it appears these records should have been put in the official Camp Lejeune case file within the Division of Health Studies. However, the asserted the records are scientifically irrelevant to any public health study conducted by the ATSDR. There appears to be enough confusion and extraneous factors investigators can elaborate on that fails to make this issue a clear and substantial violation of federal law. Further, the records were never destroyed.

4.7 Has assisted the Navy or USMC in concealing data from the public?

Investigators have not identified any instances when data or records was intentionally withheld or false data was provided by the Navy or USMC. There has been no evidence or information indicating assisted the Navy or USMC in concealing data. The allegation that was in some way improperly assisting the military in her official capacity appears to have been thoroughly confused with her position within the Public Health Service. Person(s) claimed had received a promotion from the Navy based upon favorable overtures. The promotions within the Public Health Service are not linked to the Navy and no collaboration between and the Navy was found to exist.

4.8 Why has an adult study not been performed?

The professional judgment within ATSDR varies on the scientific value of an epidemiological study of adult military residents of Camp Lejeune. However, the prevailing view at ATSDR is that a Camp Lejeune adult study would be very expensive and would not produce conclusive results. The scientific merit of epidemiological studies requires a rigorous effort to remove confounders. Such uncertainties hinder the finding of any true statistical difference in effects between the study and control populations. This view holds that the exposure to hazardous substances and other risk factors of current or former resident of Camp could be significant and would be varied and uncontrolled. These unmanageable confounders would preclude a meaningful epidemiological study for evaluating the health effects of VOC contaminants in drinking water. An important aspect of this view is that VOCs do not produce *unique* health effects relative to other day-to-day chemical exposures and risk factors posed by the American life style. Therefore, relating an effect to a given substance or risk factor would be very difficult if not impossible. The more controlled environment and exposure in a mother's womb provides conditions for a study of newborns to more likely show a causal association if it exists.

4.9 Has the ATSDR health study for Camp Lejeune followed an accepted scientific procedure and an appropriate timetable?

It appears that ATSDR is vigorously pursuing the data and procedural requirements for a sound epidemiological study. The weaknesses of many environmental health studies are (1) uncertainty or mis-classification of exposure to the substance(s) in question, (2) an inadequate comparison population and (3) low participation rates. ATSDR is giving major attention to reducing each of these uncertainties. Peer review of each aspect of the study is being conducted. This type of study is time consuming and labor intensive. In consideration of the study complexity, the effort to obtain a comprehensive record of the affected population, and the delays with privacy act issues discussed above, the study completion date of 2006-07 seems reasonable.

4.10 Has the ATSDR cooperated with this investigation?

The ATSDR has fully and openly cooperated with this investigation. Access to any employees and records have been immediately granted.

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5. PERSONS AND ENTITIES INVESTIGATED

5.1 USMC military and civilian employees

As referenced in the 1.2.1, the subjects considered were: (A) the civilian employees within MCB-CL's Natural Resources and Environmental Affairs Division (NREAD); (B) the direct military hierarchy to the NREAD, to include the Assistant Chief of Staff (AC/S) Facilities, the Chief of Staff and the Commanding General; and, (C) the civilian employees of the Naval Facilities Engineering Command Atlantic Division (LANTDIV). The following specifically details the individuals this investigation focused on.

(A) NATURAL RESOURCES AND ENVIRONMENTAL AFFAIRS DEPARTMENT (NREAD)

From was employed at MCB-CL and served as the NREAD in the time-frame. When questioned on the details of the "organic interference" indicated on the TTHM sampling results (1980-81) and the presence of TCE/PCE by Grainger Laboratories (1982). provided nondescript and emotional responses. While never denied having seen records indicating the presence of volatile organic compounds (VOC's), specifically TCE and PCE in 1982, laimed staff, said were working on it.

. was never able to specifically detail irect involvement nor his responsibilities as a supervisor on this issue. . was quick to blame officials in the Preventative Medicine Unit, the LANTDIV and senior management for not having participated in addressing this issue or better supporting the NREAD over the years. was the department head closest to the contaminated water issue with a background in science, direct access to the data, responsibility for environmental compliance, and the authority to address the matter with senior base management.

agreed to talk with investigators, but continued to claim extensive stress from this matter effected emory. admitted NREAD was responsible for failing to appropriately address the presence of contaminated drinking water. stated superiors held responsible for the failure of NREAD to identify the contaminated wells in 1982. said nor staff were ever disciplined regarding this issue by the USMC. had no knowledge of military or civilian personnel connected with this matter obstructing justice, destroying records, conspiring, or generating false writings or statements.

From to was employed at MCB-CL and served as the Soil, Water and Environment Branch of NREAD in the time-frame. was able to explain specifically how and the NREAD had addressed both the "organic interference" indicated on the TTHM sampling results and the presence of TCE/PCE by Grainger Laboratories (1982). provided both historical perspective of general industry practices for the 1980-1985 time frame and background on the few employees assigned to environmental compliance at Camp Lejeune.

explained that the NREAD at Camp Lejeune had prided itself in being a progressive, technically able Department when compared to other military installations in the 1980s. believed that while the environmental group for Camp Lejeune was essentially and they had the expertise to address the regulatory compliance issues presented at the time. In regard to the TTHM reports indicating "organic interference," stated NREAD had at the time successfully addressed the issue and kept Camp Lejeune within compliance with the regulatory limits. They simply did not interpret the "organic interference" to be indicative of a contaminated drinking water system. However, following the Grainger Laboratory letter (1982), NREAD simply failed to link the presence of TCE/PCE to individual drinking wells. summarized the contaminated water issue best when he stated that following receipt of the Grainger letter, "they simply dropped the ball."

like both . and . insisted both the bases' Preventative Medicine Unit and LANTDIV should have been directly involved in helping interpret and guide the NREAD on how to address the sample results. , acknowledged that while there had been meetings with both entities , nor supervisor ever documented these meetings nor a formal request for guidance.

has cooperated fully with this investigation and provided his best recollection of actions and decisions in the .o time-frame. , exhibited remorse and great concern on this matter. had no knowledge of military or civilian personnel connected with this matter obstructing justice, destroying records, conspiring, or generating false writings or statements.

From to served as the in the Soil, Water and Environment Branch (included the Water Quality Lab) of the NREAD. aintains the most direct knowledge and involvement with the evidence of contaminated drinking water in the 1980 to 1985 time-frame. as admitted that in retrospect and upervisors in the NREAD failed to recognize and properly address the VOC's present in the wells used to supply drinking water.

Between 1981 and 1982, appears to be the only employee that attempted to identify the source of the "interference" related to the TTHM sampling results provided by the US Army Environmental Hygiene Agency, Fort McPherson. Upon receipt of the Grainger Laboratory's letter (August 1982) indicating the presence of TCE and PCE in drinking water samples, gain attempted to locate alternative sources. From 1982 to late 1984, dmitted id not identify the source of the solvents as being several individual drinking wells. claimed to have lacked the expertise to readily identify potential public health concerns, but acknowledges ould have more aggressively addressed this issue with officials of the Preventative Medicine Unit. stated expected LANTDIV to have provided guidance at the time for both the organic interference (1980-81) and solvents (1982), having received copies of the analysis forms. tated both and Department should have requested a more official inquiry into the water issues by LANTDIV.

has cooperated fully with this investigation and provided best recollection of actions and decisions in the 1980 to 1985 time-frame. exhibited remorse and great concern on this matter. had no knowledge of military or civilian personnel connected with this matter obstructing justice, destroying records, conspiring, or generating false writings or statements.

(B) MARINE CORPS BASE - CAMP LEJEUNE MILITARY HIERARCHY

Except for the responsibility of their position, the above listed have not been implicated specifically in any document(s) or by any individuals as having been directly or indirectly responsible or significantly involved with the contaminated drinking water at MCB-CL from 1980-1985. None of the have been approached for an interview based upon this reality.

Based upon interviews with military and civilian employees at MCB-CL, was instrumental in addressing and supporting environmental issues concerning the base.

Except for the responsibility of their position, the above listed Colonel's have not been implicated in any document(s) or by any individuals as having been directly or indirectly responsible or significantly involved with the contaminated drinking water at MCB-CL from 1980-1985. None of the Colonel's have been approached for an interview based upon this reality.

Except for the responsibility of their position, the above listed Colonel's have not been implicated in any document(s) or by any individuals as having been directly or indirectly responsible or significantly involved with the contaminated drinking water at MCB-CL from 1980-1985. None of the Colonel's have been approached for an interview based upon this reality.

served in the USMC from 1959 to 1988, and was the from 1983-1985. had been responsible for briefing the on all relevant issues for the divisions within the Utilities Department. had received no briefing on a contaminated water situation by his predecessor Col. in 1983. was aware of contaminated wells being shutdown in late 1984 and early 1985. stated he relied on the NREAD to advise and recommend courses of action on all environmental issues, specifically those related to drinking water. said he and would have done what needed to be done to address contaminated water on the base.

did not recall disciplinary action as having been considered against employees of the NREAD. did not have a strong understanding on drinking water regulations nor the technical aspects of NREAD's work. had a very limited recollection on why the wells were shutdown in 198 did not express responsibility for the contaminated water issue, although he did appear to be truthful. had no knowledge of military or civilian personnel connected with this matter obstructing justice, destroying records, conspiring, or generating false writings or statements.

as an advisor to the AC/S Facilities for environmental issues from has a background in environmental science and engineering had responsibility for the NACIP program on the base and was a primary liaison between LANTDIV and Camp Lejeune [redacted]; self-described his position as a mediator tasked to communicate between Camp Lejeune's military hierarchy and the civilian employees of environmental Divisions on the base.

[redacted] appeared to be sharp and well aware of the historic contaminated water issues on the base. [redacted] admitted knowledge on both the organic interference issues and recognition of solvents by Grainger Laboratories in 1982 [redacted] claimed the NREAD had been addressing these issues in consultation with the LANTDIV. [redacted] said both [redacted] ad LANTDIV should have played a more active role in identifying and addressing the TCE/PCE contamination they were notified of in 1982. [redacted] said LANTDIV should have taken the lead on this solvent issue given the degree of expertise and research required to properly address it. This being said, [redacted] did not believe LANTDIV was an effective, contemporary component within the Naval structure.

[redacted] was forthcoming and interested in the drinking water issues. [redacted] said his interview with the Panel's investigator did not go well based upon the aggressive and inappropriate tone of the inquiry. [redacted] said he was less forthcoming as a result. [redacted] position, education, and personality made him a key employee within the 1982-1984 time frame for addressing the contaminated drinking water issues. [redacted] acknowledged responsibility for not having inserted himself more into the issue.

(C) NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION (LANTDIV)

[redacted]

[redacted] has a background in civil engineering and began with LANTDIV in 1972. By 1980, [redacted] was I [redacted] (formerly Quality) Branch. [redacted] was directly involved with the advising Camp Lejeune on EPA's published final regulations for the control of TTHMs from 1980 forward. LANTDIV was involved with setting up the contract between Camp Lejeune and the US Army Environmental Hygiene Agency, Fort McPherson.

When presented the TTHM Surveillance Report Forms for 1980-1981, acknowledged these were more than likely the results from sampling at Camp Lejeune. When asked about the comments stating "organic interference," did not recall ever having addressed this issue with Camp Lejeune. stated there could be several explanations for "organic interference" and it is not a direct indication the drinking water system was contaminated. denied having been advised of the Grainger Laboratory (1982) samples that indicated the presence of TCE and PCE, but knew Grainger had been used.

, like , colleagues, spent much time explaining LANTDIV's advisory role in the Navy's structure and its non-enforcement directive. LANTDIV appears to be setup as an internal contractor with the clear understanding they will only advise installations on regulatory policy. LANTDIV did not fall within the chain of command on Camp Lejeune. LANTDIV was not supposed to lead on issues, only advise when asked. It is was not determined if the Naval hierarchy shares this opinion.

In every interview conducted with LANTDIV employees regarding Camp Lejeune, they denied knowledge of "organic interferences" in 1980-1981, and the presence of TCE/PCE contamination in the drinking water system in 1982. was no exception. appeared to be very nervous when questioned and had difficulty articulating and recalling his past actions. In light of the Fact-Findings Panel's concurrent inquiry, there were indications LANTDIV personnel have been coached on how to address this issue.

is still employed at LANTDIV.

has a background in civil engineering and began with LANTDIV in By was a (formerly Quality) Branch under While title and self-described responsibilities (put directly over compliance at Camp Lejeune, , name is not referenced by employees of the NREAD nor the administrative file for the time-period in question.

When presented the TTHM Surveillance Forms for 1980-1981 recognized the forms. When asked about the comments stating "organic interference," ld not recall ever having addressed this issue with Camp Lejeune as fully aware of the TTHM sampling at Camp Lejeune, but did not to elaborate beyond the fact LANTDIV had merely participated in setting up the contract. enied having been advised of the Grainger Laboratory (1982) samples that indicated the presence of TCE and PCE.

had a good recollection of the responsibilities of LANTDIV at Camp Lejeune in the 1980-1985 time-period. Like and spent much time defining the lines of communication and authority between LANTDIV and USMC installations. The Fact-Finding Panel found,

The Naval Facilities Engineering Command Atlantic Division (LANTDIV), as a technical advisory organization, apparently was not aggressive in providing Camp Lejeune with information and expertise to help the base understand the significance of the contamination and subsequent test data in the early 1980s.

A direct line of responsibility is unclear and the LANTDIV employees connected to the drinking water contamination at Camp Lejeune in the early 1980s, appear to use this reality to shed direct culpability. epitomized this by willingness to spend time on the "advisory role" LANTDIV maintained. *ad* olleagues have made no effort to interpret nor probe the contaminated drinking water matter at Camp Lejeune. LANTDIV has performed no top-to-bottom review nor generated any summary of its actions.

still employed at LANTDIV.

has a background in chemistry and chemical engineering, and began with LANTDIV in

By as in the Environmental Programs (formerly Quality) Branch, Potable Water and Asbestos. vas directly involved with advising Camp Lejeune on EPA's published final regulations for the control of TTHMs from 1980 forward.

When presented the TTHM Surveillance Forms for 1980-1981, recognized the forms. When asked about the comments stating "organic interference," id not recall ever having addressed this issue with Camp Lejeune. stated there could be several explanations for "organic interference" and it should have been further analyzed via gc/ms (gas chromatography / mass spectrometry). nied having been advised of the Grainger Laboratory (1982) samples that indicated the presence of TCE and PCE.

confused the time-line of events at Camp Lejeune claiming the contaminated wells discovered during the NACIP sampling were shutdown in 1983. Again, said LANTDIV had no direct knowledge of or order to address "organic interferences" and/or solvents in the drinking water at Camp Lejeune. It was not clear whethe simply had difficulty recalling the timing of specific events or if confusion on the issue allowed o deflect responsibility.

Amr is retired.

[redacted] was a LANTDIV engineer that assisted Camp Lejeune with TTHM sampling and general drinking water issues in the [redacted] time-frame. [redacted] is still an employee within the Environmental Programs Branch of LANTDIV. [redacted] was interviewed by the lead investigator for the Fact-Finding Panel, whom stated Wallace exhibited a poor recollection of any "organic interferences" and/or solvents in the drinking water prior to 1984.

Based upon interviews with [redacted] colleagues, [redacted] appears to reiterate the LANTDIV party line that LANTDIV had no direct knowledge of or order to address "organic interferences" and/or solvents in the drinking water prior to 1984.

[redacted] is still employed at LANTDIV. [redacted] was not interviewed by EPA.

[redacted] has a background in physics and engineering, and began with LANTDIV in [redacted] By [redacted] was in the Environmental Programs (formerly Quality) Branch, but claimed to have little involvement with drinking water assessments at Camp Lejeune [redacted] participated in setting up contract labs for Camp Lejeune, but not interpretation of the analyses.

[redacted], the [redacted] in the NRHAD, said [redacted] was well aware of the TTHM "interference" issues and had been working with [redacted] to address them. When asked about the "interference" issue, [redacted] did not recall it having been an issue, nor the discovery of TCE/PCE in 1982.

Unlike [redacted] colleagues at LANTDIV, [redacted] made more of an effort to analyze the records presented to [redacted] was thorough in [redacted] responses and attempted to provide additional information to assist in our investigation.

no longer employed at LANTDIV.

5.2 ATSDR employees

[redacted]

[redacted] has been an employee of the ATSDR since [redacted] and is currently the [redacted] of the Epidemiology and Surveillance Branch of the Division of Health Studies. [redacted] received [redacted] from [redacted] and maintains a [redacted] and [redacted] from [redacted]. While the Camp Lejeune studies have had several lead investigators, [redacted] has been the [redacted] since the first ATSDR health study was published in August 1998.

There have been several citizens and victims that have questioned the length of time ATSDR has taken to complete its health assessments and studies. However, this investigation determined there was only one area of criminal culpability. In December of 2002, did [redacted] order [redacted] subordinate [redacted] to destroy records that would be considered part of the ATSDR's official Camp Lejeune case file?

In [redacted] was preparing to leave the Division of Health Studies and [redacted] position as the [redacted] on the Camp Lejeune study. In preparation for this departure and while cleaning out [redacted] office, [redacted] returned records to the official Camp Lejeune file and organized records to be taken with [redacted] At this time, [redacted] expressed concern over what records [redacted] was retaining and began more closely supervising the records [redacted] was going to take with [redacted]

[redacted] approached [redacted] regarding what [redacted] should do with sets of telephone log books [redacted] used to record names, numbers, and medical information from the public that had contacted over the years. While it is not clear gave a direct order to destroy these records, it is clear fully expected and specifically advised ,not to take any Camp Lejeune records from the Division of Health Studies.

Based upon an interview with the Division of Health Studies, it appears these records should have been put in the official Camp Lejeune case file within the Division of Health Studies. However, the asserted the records are scientifically irrelevant to any public health study conducted by the ATSDR. There appears to be enough confusion and extraneous factors investigators can elaborate on that fails to make this issue a clear and substantial violation of federal law. Further, the records were never destroyed.

Exhibit # 15

Camp Lejeune Declination: Desk Statement
EMBARGOED UNTIL 2:00 P.M., 8/25/05

After a thorough review of all pertinent evidence, the Justice Department, in consultation with the Environmental Protection Agency, has concluded that it will not seek criminal prosecution in the case regarding water contamination at the Marine Corps Base, Camp Lejeune, North Carolina. The fact that the actions in question were taken prior to the promulgation of legally enforceable standards regarding safe drinking water precludes criminal prosecutions against any of the parties involved.

The government's investigation revealed that there were neither criminal violations of the Safe Drinking Water Act, nor was there a conspiracy to withhold information, falsify data, or impede the federal investigation by members of the military and relevant public health services. Based upon the evidence, the Justice Department has concluded that no federal criminal law was broken nor was there an attempt to conceal evidence regarding a violation of any law.

Camp Lejeune was placed on EPA's National Priorities list for cleanup under the Comprehensive Environmental Response Compensation and Liability Act in 1989, and is presently undergoing cleanup as a Superfund site. The EPA will be able to provide details about the status of the cleanup. Also, the Agency for Toxic Substances and Disease Registry (ATSDR) is conducting an on-going health study.

Exhibit # 16

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NEWS THE NATIONAL ACADEMIES
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Read Full Report

Date: July 27, 2006
Contacts: Bill Kearney, Director of Media Relations
Michelle Strikowsky, Media Relations Assistant
Office of News and Public Information
202-334-2138; e-mail <news@nas.edu>

FOR IMMEDIATE RELEASE

EVIDENCE GROWING ON HEALTH RISKS FROM TCE;
CURRENT DATA ARE SUFFICIENT FOR EPA TO FINALIZE RISK ASSESSMENT

WASHINGTON -- A new report from the National Academies' National Research Council recommends research to improve understanding of how the environmental contaminant trichloroethylene causes cancer and other adverse health effects, but adds that enough information exists for the U.S. Environmental Protection Agency to complete a credible human health risk assessment now.

In 2001 EPA issued a draft risk assessment on trichloroethylene, a solvent widely used as a degreasing agent that is contaminating air, soil, and water at several military installations and hundreds of waste sites around the country. The release of the draft risk assessment was followed by much debate about the quality of evidence on trichloroethylene and how that evidence should be assessed. This prompted an interagency group to request that a Research Council committee review issues related to assessing the health risks from exposure to trichloroethylene, commonly referred to as TCE. The committee was not asked to conduct a risk assessment of its own.

The evidence on cancer and other health risks from TCE exposure has strengthened since 2001, the committee found. It pointed out that research, including studies of human populations, supports the conclusion that TCE is a potential cause of kidney cancer. Research shows that the chemical may cause other kidney problems as well, but the level of exposure needed to produce kidney damage is not clear. Animal data indicate that relatively high doses of TCE are needed to induce liver toxicity and cancer. Some epidemiology studies indicate a higher incidence of liver cancer among populations exposed to TCE, but the evidence is inconsistent. Studies of people exposed to TCE at work do not show a strong association between exposure and lung tumors, the report notes.

Animal research and human population studies suggest that TCE exposure may also be associated with other health effects, such as reproductive and developmental problems, impaired neurological function, and autoimmune disease. The committee recommended studies to advance understanding of the mechanisms by which TCE causes cancer and other health problems; which populations are most sensitive to TCE's effects; and how exposure to a mixture of TCE and other chemicals affects human health.

A large body of epidemiological data on TCE and cancer is available, but a new analysis of that data is needed to better characterize the hazard that TCE presents to humans, the committee said. It found several weaknesses in the analysis that EPA used in its draft risk assessment, as well as in an analysis developed by researchers since the draft was issued. To overcome these weaknesses, the new analysis should establish clear criteria for including epidemiological studies based on objective characteristics, the committee said. It added that it would be appropriate for EPA to use a model jointly developed with the U.S. Air Force to simulate how the body metabolizes TCE, although the model does not resolve uncertainty about the mechanisms by which the chemical causes cancer.

A model is being used to extrapolate from animal studies an estimate of the cancer risk posed by TCE at low doses. The risk is extrapolated below a "point of departure," which is associated with an incremental effect, such as 5 percent more cancers. EPA should consider a range of points of departure in its risk assessment, the committee recommended. Because there is not enough evidence on how TCE triggers cancer to choose the best model for relating the body's response to different dose levels -- a so-called dose-response model -- it is appropriate under EPA's cancer guidelines to extrapolate the risk using a linear model, in which cancer risk rises in proportion to dose.

The committee's report was funded by the U.S. Environmental Protection Agency, U.S. Department of Defense, U.S. Department of Energy, and NASA. The National Research Council is the principal operating arm of the National Academy of Sciences and the National Academy of Engineering. It is a private, nonprofit institution that provides science and technology advice under a congressional charter. A committee roster follows.

Copies of ASSESSING THE HUMAN HEALTH RISKS OF TRICHLOROETHYLENE: KEY SCIENTIFIC ISSUES will be available from the National Academies Press; tel. 202-334-3313 or 1-800-624-6242 or on the Internet at http://www.nap.edu/. Reporters may obtain a pre-publication copy from the Office of News and Public Information (contacts listed above).

# # #

[This news release and report are available at http://national-academies.org/]

NATIONAL RESEARCH COUNCIL
Division on Earth and Life Studies
Board on Environmental Studies and Toxicology

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Electric Power Research Institute
Palo Alto, Calif.

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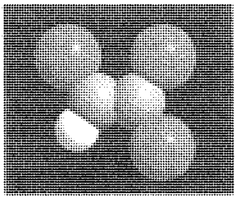
SUSAN N.J. MARTEL
Study Director

Exhibit # 17

THE NATIONAL ACADEMIES
July 2006
REPORT IN BRIEF

Assessing the Human Health Risks of Trichloroethylene: Key Scientific Issues



Trichloroethylene, a solvent widely used as a degreasing agent, is a common contaminant of air, soil, and water at manufacturing facilities, military installations, and hundreds of waste sites around the country. It is released into the air during degreasing operations and is found in soils and surface water as a result of direct discharges, and in groundwater from disposal operations. It can also be released in indoor air if tap water is contaminated, if vapors enter from contaminated groundwater nearby, or if certain consumer products (e.g., adhesives, typewriter correction fluid, paint removers) are used. Responsibility for cleaning contaminated sites is shared among several government agencies.

To help protect people from potential health effects caused by exposure to trichloroethylene, risk assessments are conducted to guide policy and risk management decisions. Risk assessments require consideration of a great deal of scientific information on trichloroethylene. There has been much debate about the quality of some sources of information and how to assess the collective evidence.

At the request of an interagency group composed of the U.S. Department of Defense, Department of Energy, Environmental Protection Agency (EPA), and the National Aeronautics and Space Administration, this National Research Council report offers independent guidance on scientific issues related to assessing health risks of trichloroethylene. The report's authoring committee reviewed a large body of technical material on trichloroethylene, including relevant scientific literature, a draft risk assessment by EPA released in 2001, scientific and technical review comments on that draft assessment, and additional information provided by the sponsoring agencies and other interested parties.

Understanding of Health Effects and Mode of Action

Trichloroethylene is metabolized in the body by two major pathways (the oxidative pathway and the glutathione-conjugation pathway). There are many animal studies that show that trichloroethylene and its metabolites (products of metabolism) are associated with several health effects, including cancer. Studies of human populations (epidemiologic studies) suggest

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that trichloroethylene may also affect human health, but less is known about the exposures needed to induce effects and physiologic responses. In all risk assessments, it is very difficult to assess the relevance of the findings of animal studies to humans. To do so requires an understanding of which metabolites are responsible for observed health effects and their "mode of action," or how the metabolites cause health effects. The following are highlights of the committee's findings:

Kidney Toxicity and Cancer

Trichloroethylene and some of its metabolites in the glutathione-conjugation pathway have been shown to be both toxic and carcinogenic to the kidneys. There is concordance between animal and human studies, which supports the conclusion that trichloroethylene is a potential kidney carcinogen. Studies with experimental animals and human tissues indicate a genotoxic mode of action. The metabolite S-dichlorovinyl-L-cysteine has been linked with the development of kidney cancer, but there are no studies of the carcinogenic potential of this metabolite. The magnitude of exposure needed to produce kidney damage is not clear. Thus, it is not possible to predict whether humans are more or less susceptible than other animals to trichloroethylene induced kidney cancer.

Liver Toxicity and Cancer

The epidemiologic evidence is mixed; some studies show an excess of liver cancer in trichloroethylene exposed populations while other studies do not. Animal data on trichloroethylene indicate that relatively high doses are needed to induce liver toxicity and cancer, even in susceptible strains of mice. Three major oxidative metabolites (trichloroacetic acid, dichloroacetic acid, and chloral hydrate) can contribute to liver toxicity and cancer in rodents. The mode of action of trichloroacetic acid as a rodent liver carcinogen is not a likely mode of action in the human liver. For the metabolite chloral hydrate, differing rates of oxidation and conjugation in rats and humans make it unlikely that the mode of action in mice is relevant to humans. The mode of action for the metabolite dichloroacetic acid in rodents is understood, but whether this metabolite is formed in humans has not been established and differences between mice and human suggest that humans would be much less susceptible to liver carcinogenesis. Thus, exposure to trichloroethylene at concentrations relevant to the general public is not likely to induce liver cancer in humans. However, it is possible that much higher exposure to trichloroethylene, such as in certain high-risk occupations or in heavily contaminated locales, could result in increased risks of liver toxicity and cancer.

Reproductive and Developmental Toxicity

Evidence from animal and epidemiologic studies suggest that exposure to trichloroethylene and one or more of its metabolites might be associated with congenital heart defects. Although there are inconsistencies in the animal data, plausibility for trichloroethylene-induced cardiac teratogenesis is increased by the fact that the most frequently observed cardiac defects in human studies are consistent with those found in animal studies. Research in animals and humans also indicates that trichloroethylene impairs intrauterine growth. However, the specific metabolites involved and the mode of action responsible for cardiac teratogenesis and poor intrauterine growth remain to be elucidated. Rodent studies also show that trichloroethylene can affect fertility in males (reduced spermatogenesis) and females (decreased fertility of oocytes), but the relevance of these findings to humans is not clear.

Neurotoxicity

Studies show that inhalation of trichloroethylene causes neurotoxic effects in laboratory animals and humans that are similar in nature (e.g., massiter reflex latency, motor incoordination, changes in heart rate) and occur at comparable concentrations of exposure. It has been suggested that exposure to trichloroethylene during early development could enhance its effects on the nervous system, but the available data are insufficient to draw firm conclusions. Some studies suggest a contribution of trichloroethylene to Parkinson's disease. Multiple mechanisms appear to contribute to the neurotoxic action of trichloroethylene, and further study is needed to elucidate them more precisely.

Respiratory Toxicity and Cancer

Trichloroethylene has been shown to induce lung tumors in rodents. The mode of action for this effect is localization of trichloroethylene metabolites in the Clara cells of the lungs. The collective evidence indicates that rodents and humans are significantly different in their capacity to metabolize trichloroethylene in the lungs, with humans having less capacity. Results of most epidemiologic studies of occupational exposure to trichloroethylene do not show a strong association between trichloroethylene exposure and increased incidence of lung tumors. Thus, pulmonary cancer does not appear to be a critical end point in assessing human health risks to trichloroethylene.

Immunotoxicity

Studies in genetically susceptible rodents have shown that trichloroethylene exacerbates underlying autoimmune disease, and supporting information comes from multiple human studies of scleroderma and exposures to organic solvents. Some individuals might be genetically susceptible to developing autoimmune disease. The metabolites and the mode of action involved have not been elucidated, but a role for chloral has been implicated in mouse models.

New Analysis Needed to Synthesize Collective Evidence on Cancer Risk

A large body of epidemiologic studies is available on trichloroethylene and possible cancer risks. Synthesizing the data from multiple studies is difficult and requires a quantitative "meta-analysis" of the data. There are two available meta-analyses, one developed by Wartenberg et al., whose analysis EPA used in its draft health risk assessment, and another by Kelsh et al. The committee found several weaknesses in the techniques used in both analyses. Problems included the use of subjective, tiered systems to classify and weigh studies, separate analyses of case-control and cohort studies, and the fact that these analyses did not consider identifying amounts of exposure in the studies. The report recommends that a new meta-analysis be developed to support a human health risk assessment.

Pharmacokinetic Modeling is Useful in Guiding Research

Physiologically based pharmacokinetic (PBPK) models are used to describe the absorption, distribution, metabolism, and elimination of trichloroethylene in an organism. They can be used to estimate doses of metabolites in target tissues and organs ("dose metrics"), derive human equivalent doses from animal data, and make route-to-route extrapolations. Several PBPK models for trichloroethylene have been developed over the past few decades. The models EPA used in its draft risk assessment are the Fisher models, which were designed to focus on liver cancer in rats and humans, and the Clewell model, which is more complex and designed for covering liver toxicity and cancer, kidney toxicity and cancer, and lung cancer. A "harmonized" model has been developed as part of a joint effort between the U.S. Air Force and EPA. The committee found that the harmonized model is the best model available. However, the dose metrics most appropriate for different health end points has not been determined, so it is appropriate to consider multiple dose metrics generated from PBPK models as well as non-modeled metrics (e.g., no observed adverse effect level) when conducting a risk assessment.

PBPK models are useful tools for identify data gaps and research needs to reduce uncertainty in risk assessment. They do not resolve uncertainty about the mode of action, but can inform experimental designs for studying mode of action. Better understanding of mode of action will drive model elaboration in the future.

Improvements Needed to Estimate Health Risks at Low Doses

Because most of the population is exposed to trichloroethylene at doses lower than those in animal and occupational studies, it is important to estimate risk at these lower doses. This requires a few steps, including selection of a "point of departure," which corresponds to a level of incremental health effects, such as a 5% increase in incidence of cancer, and selection of an appropriate model to extrapolate from the dose at the point of departure to zero dose. For risks of cancer, EPA's guidelines call for selecting a point of departure from among modeled doses near the lower end of the observed range (1%, 5%, and 10%). The report recommends that several points of departures be considered and compared for cancer and non-cancer end points. There are several approaches to extrapolating from the point of departure to zero, including linear and nonlinear methods. Because there is insufficient evidence on mode of action to establish the best dose-response model for trichloroethylene, it is appropriate under EPA's cancer guidelines to extrapolate the risk using a linear model where cancer risk is proportional to dose.

Evidence Strong Enough to Complete Risk Assessment

The committee found that the evidence on carcinogenic risk and other health hazards from exposure to trichloroethylene has strengthened since 2001. Hundreds of waste sites in the United States are contaminated with trichloroethylene, and it is well documented that individuals in many communities are exposed to the chemical, with associated health risks. Thus, the committee recommends that federal agencies finalize their risk assessment with currently available data so that risk management decisions can be made expeditiously.

Committee on Human Health Risks of Trichloroethylene: Rogene F. Henderson (*Chair*), Lovelace Respiratory Research Institute, Albuquerque, NM; **Scott Bartell**, Emory University, Atlanta, GA; **Scott W. Burchiel**, University of New Mexico, Albuquerque; **Deborah A. Cory-Slechta**, University of Medicine and Dentistry of New Jersey, Piscataway; **Mary E. Davis**, West Virginia University Medical Center, Morgantown; **Kelly J. Dix**, Lovelace Respiratory Research Institute, Albuquerque, NM; **Mark S. Goldberg**, McGill University, Montreal, Quebec, Canada; **Evan Kharasch**, Washington University in St. Louis, St. Louis, MO; **Serrine S. Lau**, University of Arizona, Tucson; **Jose Manautou**, University of Connecticut, Storrs; **D. Gail McCarver**, Medical College of Wisconsin, Milwaukee; **Harihara Mehendale**, University of Louisiana, Monroe; **Peter Mueller**, University of Texas, Houston; **John M. Peters**, University of Southern California, Los Angeles; **Thomas J. Smith**, Harvard School of Public Health, Boston, MA; **Leslie Stayner**, University of Illinois, Chicago; **Rochelle W. Tyl**, RTI International, Research Triangle Park, NC; **Jack P. Vanden Heuvel**, Penn State University, University Park, PA; **Janice W. Yager**, Electric Power Research Institute, Palo Alto, CA; **Susan N. J. Martel** (Study Director), National Research Council.

This report brief was prepared by the National Research Council based on the committee's report. For more information, contact the Board on Environmental Studies and Toxicology at (202) 334-3060 or visit http://dels.nas.edu/best. *Assessing the Human Health Risks of Tricholoroethylene: Key Scientific Issues* is available from the National Academies Press, 500 Fifth Street, NW, Washington, D.C. 20001; (800) 624-6242; www.nap.edu.

This study was sponosored by the U.S. Department of Defense, U.S. Department of Energy, U.S. Environmental Protection Agency, and National Aeronautics and Space Administration.

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Exhibit # 18

??5- -850215

PROCEDURES FOR OPERATING THE "NEW WELL" AT TARAWA TERRACE

TT-23

1. The discovery of VOC's at two wells at Tarawa Terrace (TT26 and TT New Well) has resulted in turning these wells off. However, on 11 March 1985 the New Well was operated for 24 hours and the finished water sample indicated 6.6 PPB tetrachloroethylene (4CE). No other VOC's were discovered. The New Well has been operated three times (7 hours each time) since 11 March 1985 with the following results:

	22 April 1985	23 April 1985	29 April 1985
TCE	4.1 PPB	1.4 PPB	0 PPB
4CE	1.0 PPB	0 PPB	3.7 PPB

2. The low quantities of VOC's detected after running the well for seven hours during peak demand periods permits the following instructions to be issued concerning turning on the New Well:

INSTRUCTIONS FOR WATER SYSTEM AT TARAWA TERRACE/CAMP JOHNSON

1. The Booster Pump (D-39) will be started when the Tarawa Terrace reservoir reaches 8'. The Booster Pump will be secured when the reservoir reaches 9'6".

2. The New Well will be started when the reservoir reaches 6'5". The well will be secured when the reservoir reaches 8'.

3. The Booster Pump (D-39) will be turned off when the Montford Point reservoir level is below 7' (even if the Tarawa Terrace reservoir is below 9'6").

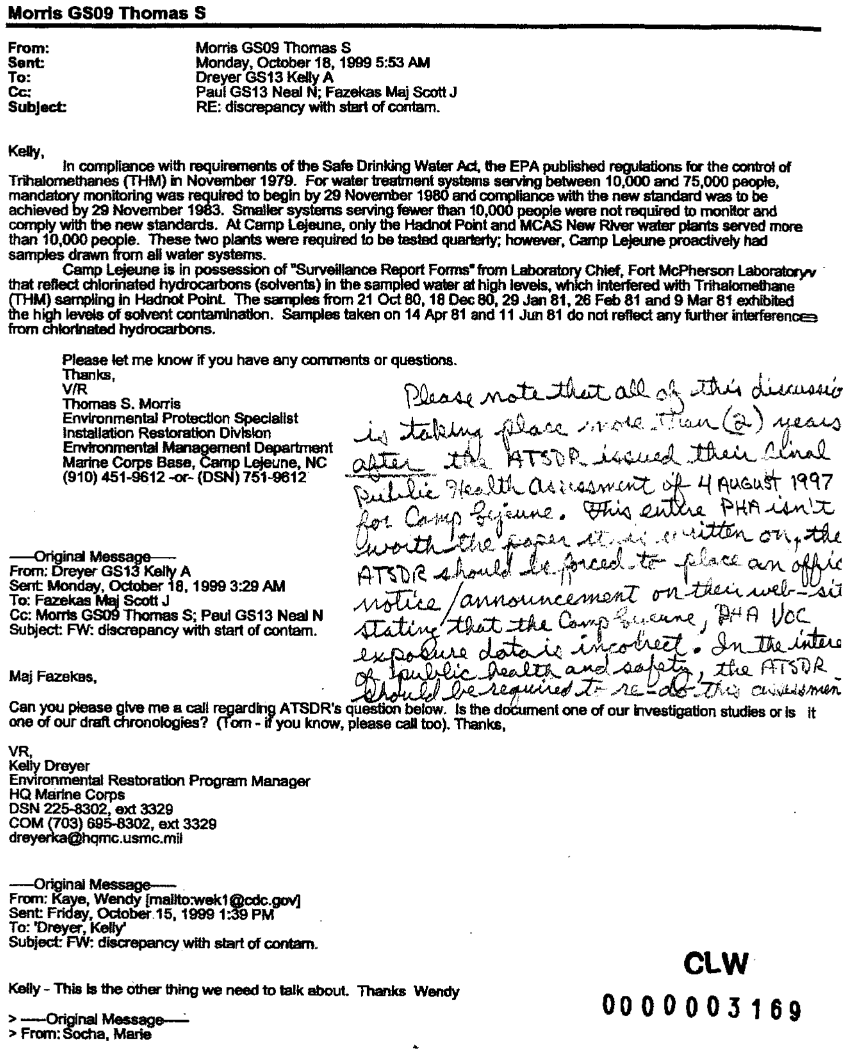
4. The New Well will not be turned on for more than seven hours in any 24-hour period.

5. TT26 well will not be turned on!

3. Water samples will be taken (finished water) the next day after the New Well has been operated. The Natural Resources and Environmental Affairs (NREAD) Office will be notified to take the sample. (If the well was operated from 0100-0600 on Saturday morning, notify NREAD at 0800 Saturday morning.) The Command Duty Officer (Telephone 2523/2528) will be notified when the New Well is turned on and turned off.

4. The Base Maintenance Officer will be called before turning on the New Well during normal working hours.

5. Water sample analysis will be expedited by the NREA Division using commercial lab and 48-hour turnaround.



Morris GS09 Thomas S

From: Morris GS09 Thomas S
Sent: Monday, October 18, 1999 5:53 AM
To: Dreyer GS13 Kelly A
Cc: Paul GS13 Neal N; Fazekas Maj Scott J
Subject: RE: discrepancy with start of contam.

Kelly,

In compliance with requirements of the Safe Drinking Water Act, the EPA published regulations for the control of Trihalomethanes (THM) in November 1979. For water treatment systems serving between 10,000 and 75,000 people, mandatory monitoring was required to begin by 29 November 1980 and compliance with the new standard was to be achieved by 29 November 1983. Smaller systems serving fewer than 10,000 people were not required to monitor and comply with the new standards. At Camp Lejeune, only the Hadnot Point and MCAS New River water plants served more than 10,000 people. These two plants were required to be tested quarterly; however, Camp Lejeune proactively had samples drawn from all water systems.

Camp Lejeune is in possession of "Surveillance Report Forms" from Laboratory Chief, Fort McPherson Laboratory that reflect chlorinated hydrocarbons (solvents) in the sampled water at high levels, which interfered with Trihalomethane (THM) sampling in Hadnot Point. The samples from 21 Oct 80, 18 Dec 80, 29 Jan 81, 26 Feb 81 and 9 Mar 81 exhibited the high levels of solvent contamination. Samples taken on 14 Apr 81 and 11 Jun 81 do not reflect any further interference from chlorinated hydrocarbons.

Please let me know if you have any comments or questions.
Thanks,
V/R
Thomas S. Morris
Environmental Protection Specialist
Installation Restoration Division
Environmental Management Department
Marine Corps Base, Camp Lejeune, NC
(910) 451-9612 -or- (DSN) 751-9612

Please note that all of this discussio is taking place more than (2) years after the ATSDR issued their final public Health assessment of 4 AUGUST 1997 for Camp Lejeune. This entire PHA isn't worth the paper it is written on, the ATSDR should be forced to place an offic notice/announcement on their web-sit stating that the Camp Lejeune, PHA VOC exposure data is incorrect. In the intere of public health and safety, the ATSDR should be required to re-do this assessmen

-----Original Message-----
From: Dreyer GS13 Kelly A
Sent: Monday, October 18, 1999 3:29 AM
To: Fazekas Maj Scott J
Cc: Morris GS09 Thomas S; Paul GS13 Neal N
Subject: FW: discrepancy with start of contam.

Maj Fazekas,

Can you please give me a call regarding ATSDR's question below. Is the document one of our investigation studies or is it one of our draft chronologies? (Tom - if you know, please call too). Thanks,

VR,
Kelly Dreyer
Environmental Restoration Program Manager
HQ Marine Corps
DSN 225-8302, ext 3329
COM (703) 695-8302, ext 3329
dreyerka@hqmc.usmc.mil

-----Original Message-----
From: Kaye, Wendy [mailto:wek1@cdc.gov]
Sent: Friday, October 15, 1999 1:39 PM
To: 'Dreyer, Kelly'
Subject: FW: discrepancy with start of contam.

Kelly - This is the other thing we need to talk about. Thanks Wendy

> -----Original Message-----
> From: Socha, Marie

Wendy Kaye — ATSDR
Marie Socha — ATSDR

> **Sent:** Friday, October 15, 1999 1:34 PM
> **To:** Kaye, Wendy
> **Subject:** discrepancy with start of contam.
>
> Hi Wendy,
>
> There is a slight discrepancy between when the ATSDR documents state that the water contamination at Camp Lejeune was first found versus what Fazekas states. He stated that the contamination started in 1980; our documents state that is was in 1982. I wanted to get the name of the report which states the 1980 date, as well as a copy of it. However, I have not yet received it from Major Fazekas. IF you get a chance to talk to someone about this, please ask them for a copy of the supporting document.
>
> Thanks!
> Marie
>
> Marie L. Socha, MS, MSPH
> ATSDR/Division of Health Studies,
> Epidemiology and Surveillance Branch
> 1600 Clifton Road NE, Mailstop E-31
> Atlanta, Georgia 30333
> Phone: 404-639-6203
> Fax: 404-639-6219
>
>

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

May 4, 2007

Mr. Jerome M. Ensminger
8270 Highway 41 West
Richlands, North Carolina 28574

Dear Mr. Ensminger:

Thank you for your letter of April 16, 2007, expressing concern about the validity of the 1997 Public Health Assessment for Marine Corps Base Camp Lejeune. As a scientific public health agency, it is important to us that our reports contain the most current and scientifically correct information available at the time.

We acknowledge that the references used for the development of the 1997 public health assessment are no longer available in the Agency for Toxic Substances and Disease Registry's (ATSDR) files. A move of ATSDR staff resulted in our files of Camp Lejeune-related documents being temporarily relocated. A private contractor mistakenly disposed of the documents. Although unfortunate that the material referenced in the public health assessment is no longer available in ATSDR's files, the original information and data, with the exception of original ATSDR references, may still be available from their original sources. What does This

The 1997 public health assessment (PHA) evaluated exposures based on data that was first collected in 1982. There was no sampling data prior to 1982. There was no error in the PHA; however, there were data gaps. The PHA fulfilled its purpose in identifying exposed populations, concluding that more information was needed, and recommending further epidemiological studies to help identify potential health effects. The water modeling effort has provided additional information about the exposure prior to 1982 and has increased the knowledge of the usage of the water distribution systems. This new information has better defined timelines of contamination in drinking water. ATSDR will use the new exposure information to reassess the 1998 Sonnenfeld et al. study, as well as for any new epidemiological studies.

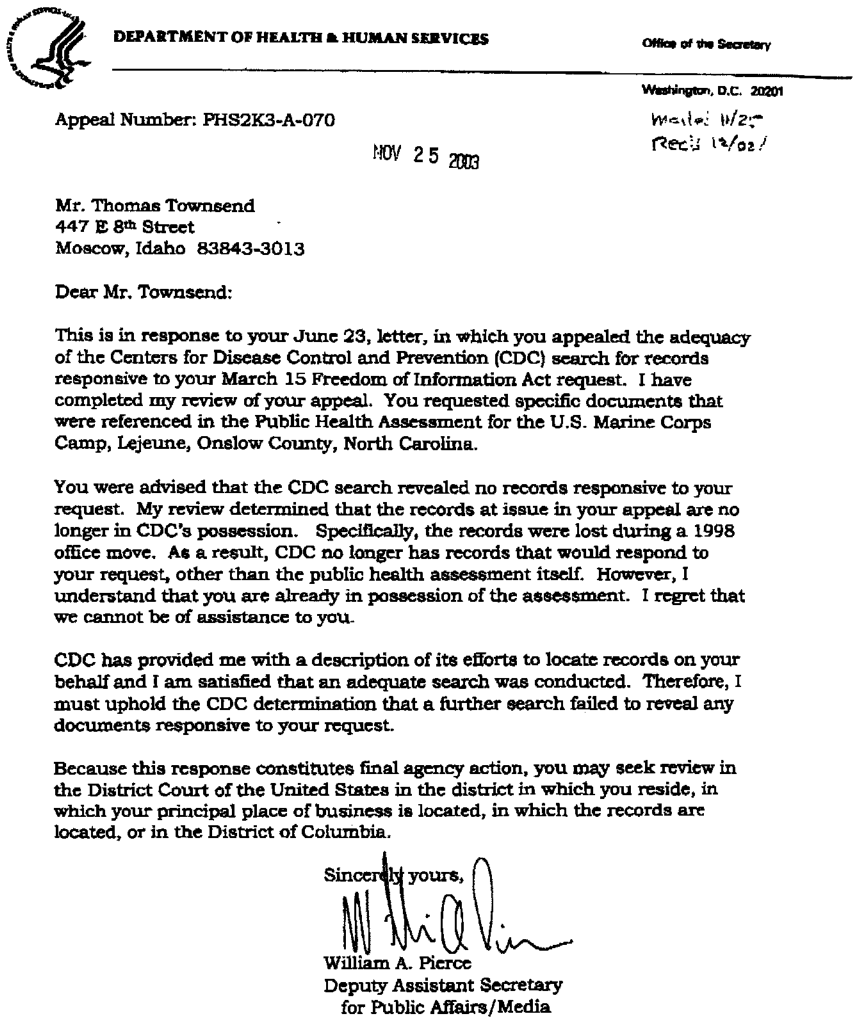
There was the 1 October 1980 composite sample results that were taken by LantDiv and the U.S. Army Environmental Hygiene Team results from 1980 - 1981. J.M.E

We are sincerely saddened by the losses you and other Marines have experienced. ATSDR is working hard to further scientific knowledge so that some day we will have more information about diseases associated with environmental exposure.

Sincerely,

Howard Frumkin, M.D., Dr.P.H.
Director, National Center for Environmental Health/
Agency for Toxic Substances and Disease Registry

cc:
Senator Barbara Boxer
Senator Carl Levin
Senator Elizabeth Dole
Senator James Webb
Representative John Dingell
Representative Ike Skelton
Representative Bart Stupek
Representative Solomon Ortiz
Representative Elijah Cummings
Mr. Morris Maslia
Dr. Frank Bove



DEPARTMENT OF HEALTH & HUMAN SERVICES

Office of the Secretary

Washington, D.C. 20201

Mailed 11/25
Rec'd 12/02/

Appeal Number: PHS2K3-A-070

NOV 25 2003

Mr. Thomas Townsend
447 E 8th Street
Moscow, Idaho 83843-3013

Dear Mr. Townsend:

This is in response to your June 23, letter, in which you appealed the adequacy of the Centers for Disease Control and Prevention (CDC) search for records responsive to your March 15 Freedom of Information Act request. I have completed my review of your appeal. You requested specific documents that were referenced in the Public Health Assessment for the U.S. Marine Corps Camp, Lejeune, Onslow County, North Carolina.

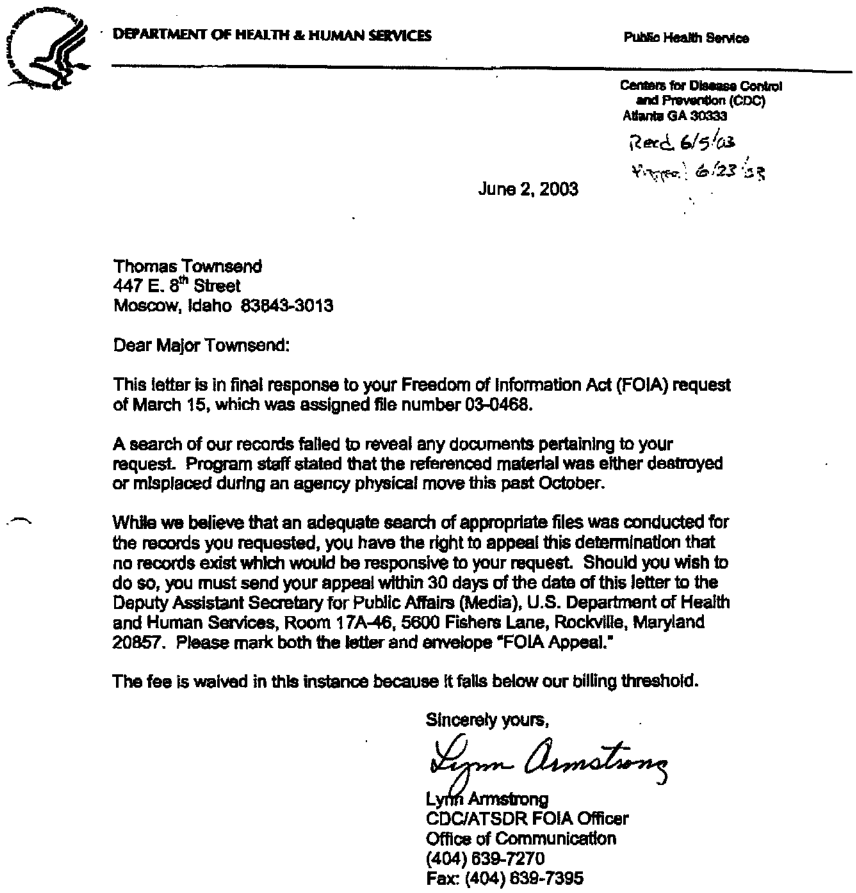
You were advised that the CDC search revealed no records responsive to your request. My review determined that the records at issue in your appeal are no longer in CDC's possession. Specifically, the records were lost during a 1998 office move. As a result, CDC no longer has records that would respond to your request, other than the public health assessment itself. However, I understand that you are already in possession of the assessment. I regret that we cannot be of assistance to you.

CDC has provided me with a description of its efforts to locate records on your behalf and I am satisfied that an adequate search was conducted. Therefore, I must uphold the CDC determination that a further search failed to reveal any documents responsive to your request.

Because this response constitutes final agency action, you may seek review in the District Court of the United States in the district in which you reside, in which your principal place of business is located, in which the records are located, or in the District of Columbia.

Sincerely yours,

William A. Pierce
Deputy Assistant Secretary
for Public Affairs/Media



DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Centers for Disease Control
and Prevention (CDC)
Atlanta GA 30333

Recd. 6/5/03
[illegible] 6/23/03

June 2, 2003

Thomas Townsend
447 E. 8th Street
Moscow, Idaho 83843-3013

Dear Major Townsend:

This letter is in final response to your Freedom of Information Act (FOIA) request of March 15, which was assigned file number 03-0468.

A search of our records failed to reveal any documents pertaining to your request. Program staff stated that the referenced material was either destroyed or misplaced during an agency physical move this past October.

While we believe that an adequate search of appropriate files was conducted for the records you requested, you have the right to appeal this determination that no records exist which would be responsive to your request. Should you wish to do so, you must send your appeal within 30 days of the date of this letter to the Deputy Assistant Secretary for Public Affairs (Media), U.S. Department of Health and Human Services, Room 17A-46, 5600 Fishers Lane, Rockville, Maryland 20857. Please mark both the letter and envelope "FOIA Appeal."

The fee is waived in this instance because it falls below our billing threshold.

Sincerely yours,

Lynn Armstrong

Lynn Armstrong
CDC/ATSDR FOIA Officer
Office of Communication
(404) 639-7270
Fax: (404) 639-7395

Jerome M. Ensminger
8270 Highway 41 West
Richlands, NC 28574
(910) 625-9711

April 16, 2007

Dr. Howard Frumkin
1600 Clifton Road NE
Atlanta, Ga. 30333

RE: References for the August 4, 1997 Public Health Assessment of Camp Lejeune, NC EPA Facility ID: NC6170022580

Dear Dr. Frumkin,

It has come to my attention that the references for the Agency for Toxic Substances and Disease Registry's (ATSDR) Public Health Assessment (PHA) for Camp Lejeune no longer exist at your agency. As I am quite sure, you are aware that there are several areas of this PHA that are factually incorrect, primarily the drinking water distribution data. This incorrect data not only gives the public erroneous exposure information in an official U.S. government document, it has also skewed one study that has been completed at Camp Lejeune (The 1998 Small for Gestational Age Study). Mr. Thomas Townsend and I identified this error several years ago and it is our goal to ensure that the correct data for Camp Lejeune is reflected in your agency's document. Upon our discovery of this erroneous information Mr. Townsend requested all of the PHA reference material through a Freedom of Information Act (foia) request and he received two denial letters stating 1.) that the information he was requesting had been lost during a move; and 2.) that a private contractor had mistakenly destroyed the documents. In light of this information, how can your agency continue to support a document that it can not even provide the references from which it s created? It is my contention that the PHA for Camp Lejeune is "null and void" if these references can t be located to substantiate the data contained within it.

Your agency has known about the incorrect data contained in the Camp Lejeune PHA since October 2003 and no one has attempted to correct the erroneous information. It is time to set the record straight!

Sincerely,

Jerome M. Ensminger

Enclosure(s)

Cc: Senator Barbara Boxer
Senator Carl Levin
Senator Elizabeth Dole
Senator James Webb
Representative John Dingell
Representative Ike Skelton
Representative Bart Stupek
Representative Solomon Ortiz
Representative Elijah Cummings
Mr. Morris Maslia
Dr. Frank Bove

Camp Lejeune Water Linked to Birth Defects, Cancers

Marines Contacting Parents

By ROBERT BURNS
.c The Associated Press

WASHINGTON (Nov. 1) - The Marine Corps is trying to notify the parents of an estimated 10,000 children born at Camp Lejeune, N.C., between 1968 and 1985 that they may have consumed water contaminated with compounds that have been linked to birth defects and childhood cancers such as leukemia.

The substances, believed to have come from a dry cleaning business, were found in 1982 in drinking water systems that supplied houses on Camp Lejeune, although the wells were not capped until 1985.

Camp Lejeune is the largest Marine Corps base in the eastern United States.

Based on a relatively small sampling of Camp Lejeune families, the federal Agency for Toxic Substances and Disease Registry published a report in 1998 identifying a potential link between the contaminated water and birth defects.

Last year, the agency started notifying previous residents of Camp Lejeune in order to survey their health histories. But so far they have reached only 6,500 of the 16,500 families that may have been exposed to the contaminated water.

Col. Michael Lehnert, who heads the Marine Corps facilities and services division, told a Pentagon news conference Wednesday that some Marine Corps families who lived in base housing at Camp Lejeune have "raised serious questions about their children's health" in relation to the drinking water problem.

Lehnert noted that some have questioned why the Marines waited so long to attempt to reach the full population of families that may be affected. Because they weren't ever going to notify us. It was nly because of CERCLA and RCRA that we ever found out about this.

"at is a valid concern," he said. "It would be virtually impossible for me or anyone else to go back and analyze the many decisions that were made with regard to this situation since 1985. What I can tell you is that I truly believe that the decisions that were made were based upon the best information that science could provide at that time." ↖ B. S. !!

The contaminants in question are tetrachloroethylene (PCE), also called perchloroethylene, and trichloroethylene (TCE). They are commonly used in dry cleaning, as degreasing agents in the metal processing industry, as solvent and extractant in the chemical and textile industry, and in the production of dyes and rubber.

Dr. Wendy Kaye, chief of epidemiology at the Agency for Toxic Substances and Disease Registry, told the Pentagon news conference that several previous studies of health effects of these two compounds on unborn children have indicated links to birth defects and childhood cancers such as leukemia.

"So there is some concern about an increased risk," she said.

The Marine Corps' awareness of a water contamination problem at Camp Lejeune dates back at least to October 1980 when an Army environmental team sampled the water distribution systems there and discovered unidentified chlorinated hydrocarbons, pollutants of which PCE and TCE are two examples.

According to an official Marine Corps chronology of the contamination issue, "it is unknown" whether the contamination found in the 1980 testing was reported to Camp Lejeune officials.

Keye's agency wants to survey the additional 10,000 Marine Corps families it has not yet reached. Based on the results, the agency may conduct a health study to learn more about the risks associated with exposure, she said.

The Marines have had trouble finding the families. They have established a toll-free telephone number (800-639-4270) and a on the Marines' website, http://www.usmc.mil, for information about the issue.

AP-NY-11-01-00 1602EST

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Press Release

Division of Public Affairs
Headquarters, U. S. Marine Corps
Washington, D. C. 20380-1775
Telephone: 703-614-4309 DSN 224-4309 Fax 703-695-7460
Contact: Capt Steve Butler

Release # 1101-00-1408
Nov. 1, 2000

Marine Corps Encouraging Participation in Environmental Health Survey

HEADQUARTERS, U.S. MARINE CORPS, WASHINGTON, DC--Marine Corps officials are trying to reach an additional 10,000 former residents of Camp Lejeune's on-base housing who may have been exposed to contaminants in the water supply prior to 1985.

The effort is being made in support of the Agency for Toxic Substances and Disease Registry (ATSDR), a public health service agency. ATSDR is attempting to survey previous on-base housing residents to determine if exposure to drinking water may be related to specific health concerns in children that were conceived during the time of exposure. The survey, which began in September 1999, is seeking parents of those children born or conceived while living at base family housing at Camp Lejeune between 1968 and 1985.

Depending on the results of the survey, the ATSDR may conduct a health study to enhance scientific understanding of the health risks associated with exposure to volatile organic compounds (VOCs) in the water supply. It is now known that VOCs were present in base water distribution systems that provided water to on-base housing.

The survey focuses on two specific VOCs, tetrachloroethylene (PCE) and trichloroethylene (TCE), often used in dry cleaning or as degreasers. Those substances were found in the Camp Lejeune water systems that supplied the on-base housing areas prior to 1985.

All of the wells containing VOCs were shut down by early 1985. Currently, all drinking water at Camp Lejeune is regularly tested and is safe to drink.

For the past year, ATSDR and Camp Lejeune officials have been trying to contact the former residents using a combination of methods including direct mail, news releases around military bases, notices in military publications, and open houses. To date over 6,500 former residents have been contacted; however, a significant number of former residents have not yet been located. In an effort to extend the search for potential survey participants, Marine Corps officials in Washington are asking national news organizations to assist them in locating these former Camp Lejeune residents and their families.

"The health and welfare of Marines and their families is very important to us," said Colonel Mike Lehnert, head of the Marine Corps' Facilities and Services Division. "We have Marine families with questions that cannot be answered unless the survey is completed, so it is

3 June 2007

Please note the difference between this "actual" press release and the "draft" version. The USMC was starting to "trickle" the truth out about Tarawa Terrace but they had yet to have acknowledged the truth about the Holcomb Blvd. service area. It is quite obvious from reviewing this packet of documents (which I printed off in Nov. 2000) they (USMC) were having a difficult time conveying very important to us that we do everything possible to help ATSDR reach as many of the former residents as we can."

Lehnert added that it is important for all individuals who qualify for the survey to participate, whether or not their children have experienced any health concerns."

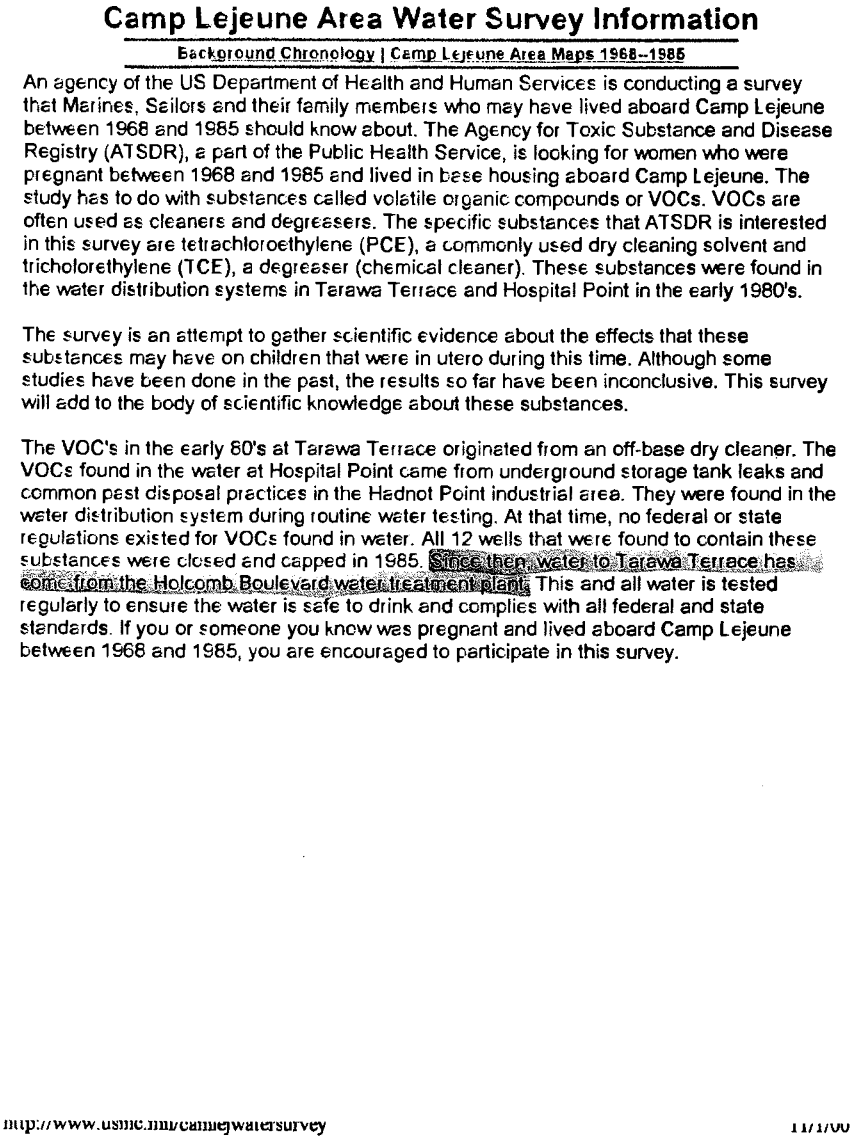
The 35-question health survey is conducted by telephone and attempts to gather data which may be used in a follow-up scientific research study about the effects that these substances may have on children when exposed before birth.

All families whose children were born or conceived at Camp Lejeune from 1968 through 1985 are encouraged to participate in this survey, whether or not the child has exhibited any health concerns. To participate, call the National Opinion Research Center (NORC) at (800) 639-4270. NORC is conducting the survey for the ATSDR. For more information about the ongoing study, call the ATSDR at (888) 42-ATSDR, extension 5132. The Marine Corps has also established a toll free number at (877) 261-9782 and a website [http://www.usmc.mil/camlejwatersurvey] for general information. All media queries should be directed to Capt Steve Butler, Public Affairs, Headquarters Marine Corps at (703) 614-2019.

-30-

Text-only version of release attached below:

MCATSDRnov2.txt



Camp Lejeune Area Water Survey Information

Background Chronology | Camp Lejeune Area Maps 1968–1985

An agency of the US Department of Health and Human Services is conducting a survey that Marines, Sailors and their family members who may have lived aboard Camp Lejeune between 1968 and 1985 should know about. The Agency for Toxic Substance and Disease Registry (ATSDR), a part of the Public Health Service, is looking for women who were pregnant between 1968 and 1985 and lived in base housing aboard Camp Lejeune. The study has to do with substances called volatile organic compounds or VOCs. VOCs are often used as cleaners and degreasers. The specific substances that ATSDR is interested in this survey are tetrachloroethylene (PCE), a commonly used dry cleaning solvent and tricholorethylene (TCE), a degreaser (chemical cleaner). These substances were found in the water distribution systems in Tarawa Terrace and Hospital Point in the early 1980's.

The survey is an attempt to gather scientific evidence about the effects that these substances may have on children that were in utero during this time. Although some studies have been done in the past, the results so far have been inconclusive. This survey will add to the body of scientific knowledge about these substances.

The VOC's in the early 80's at Tarawa Terrace originated from an off-base dry cleaner. The VOCs found in the water at Hospital Point came from underground storage tank leaks and common past disposal practices in the Hadnot Point industrial area. They were found in the water distribution system during routine water testing. At that time, no federal or state regulations existed for VOCs found in water. All 12 wells that were found to contain these substances were closed and capped in 1985. Since then, water to Tarawa Terrace has come from the Holcomb Boulevard water treatment plant. This and all water is tested regularly to ensure the water is safe to drink and complies with all federal and state standards. If you or someone you know was pregnant and lived aboard Camp Lejeune between 1968 and 1985, you are encouraged to participate in this survey.

http://www.usmc.mil/camlejwatersurvey 11/1/00

Chronology of Water Comtamination at Marine Corps BaseCamp Lejeune

October 1980 - In compliance with federal guidelines, Camp Lejeune began sampling its water distribution systems for Trihalomethane (THMs). The U.S. Army Environmental Hygiene Agency from Fort McPherson conducted the water testing and discovered unidentified chlorinated hydrocarbons in the Camp Lejeune water system. It is unknown whether the results of these test were reported to Camp Lejeune officials, and it is uncertain if base officials were apprised of the contamination.

May 1982 - During routine water quality testing, Tricholoroethylene (TCE) and tetrachloroethylene (PCE) were identified as contaminants in the drinking water distribution systems serving Tarawa Terrace and Hadnot Point housing areas. The source of the contamination was unknown, and subsequent testing and sampling of the water quality produced inconsistent and conflicting results. Base officials decide to have ongoing Navy Assessment and Control of Installation Pollutants (NACIP) confirmation study look into the issue.

November 1984 - The results reported for several wells serving the Hadnot Point housing areas surveyed as part of NACIP study indicate the presence of Volatile Organic Compounds (VOCs). Camp Lejeune officials decide to shut down all VOC-contaminated wells.

December 1984 - Camp Lejeune's base newspaper "The Globe" publishes an article about results of water testing, contamination and corrective actions aboard the base. Notification of residents occurs to keep them informed of ongoing base efforts with regard to health and safety.

January 1985 - Camp Lejeune officials decide to test all eight of the base's water systems and every well for possible VOC contamination. This additional testing discovers two additional contaminated wells in Tarawa Terrace and two additional contaminated wells in Hadnot Point. Upon confirmation of these results, the wells are shut down.

27 January 1985 - An accidental fuel line leak contaminates Holcomb Boulevard water distribution system. Upon discovery, the plant is immediately shut down. Base officials, believing all contaminated wells in the Hadnot Point systems have been shut down, route water from the Hadnot Point water treatment plant into lines serving Berkeley Manor, Watkins Village, Paradise Point, Hospital Point, Midway Park and Stone Street housing areas. Unknown to officials, two wells in the Hadnot Point system are still contaminated. The Holcomb Boulevard system is flushed and put back on line 9 days later when repairs to the fuel line leak are completed.

8 February 1985 - All contaminated wells have been shut down.

April 1985 -Tarawa Terrace residents are notified by Base Commander, MajGen L.H. Buehl, about contamination of their water systems and informed about water conservation plans that are required while water systems is re-routed to provide them with adequate water after the closure of the two additional wells closed within the Tarawa Terrace system.

9 May 1985 - Camp Lejeune issues a press release announcing the water contamination problem and explaining the steps being taken to restore water services to the effected base residents. Jacksonville Daily News and Wilmington Morning Star print stories on the situation May 11 and 12.

June 1985 - Holcomb Boulevard water distribution auxiliary line to Tarawa Terrace is completed. Water is tested at least monthly for VOCs.

March 1987 - Holcomb Boulevard plant expansion is completed. Tarawa Terrace plant is closed. All water to Tarawa Terrace is subsequently provided by Holcomb Boulevard plant.

May 1987 - The North Carolina Solid and Hazardous Waste Management Branch identifies ABC dry cleaners as possible source of Tarawa Terrace ground water contamination through the Superfund program. The Marine Corps provides technical and administrative assistance as necessary to facilitate help them accomplish remediation and cleanup

September 1988 - North Carolina Department of Natural Resources and Community Development established its first state standards for monitoring requirements of TCE and PCE in ground water.

1991 - ATSDR makes first site visit to Camp Lejeune as part its statutory duty to conduct a public health assessment. Marine Corps provides information and assistance for the duration.

1997 - ATSDR publishes final public health assessment for Camp Lejeune.

1998 - ATSDR publishes final report "Volatile Organic Compounds in Drinking Water and Adverse Pregnancy Outcomes" Though the report identified a potential association between contaminated water and adverse pregnancy outcomes at Camp Lejeune, ATSDR instructed that the report should be interpreted with caution due to the small sample size. This indicated a need for further study.

17 September 99 -- ATSDR sends letters out to previous residents of Camp Lejeune who met their criteria for a established survey. Survey participants were identified through health and housing records. The Marine Corps cooperated with ATSDR to identify and build a database of Camp Lejeune residents who met the criteria for the survey.

January 2000 - Camp Lejeune holds an open house with base residents and Jacksonville community to discuss issues pertaining to the contaminated water previously discovered aboard the base.

15 August 2000 - Marine Corps Headquarters in Washington sends a message to all Marines worldwide in an effort to reach potential ATSDR survey participants. Articles are published in numerous base newspapers including the Quantico Sentry, Camp Lejeune Globe and Camp Pendleton Scout, which have a large retired military readership. A number of other publications also publish information contained in this message.

12 September 2000 - Camp Lejeune solicits participants for the ATSDR survey by sending press release to military base publications.

24 October 2000 - After concluding that efforts to reach a sufficient number of participants for the ATSDR survey had not succeeded, the Marine Corps decides to move the communication effort to its Washington headquarters and begins planning an national media outreach campaign.

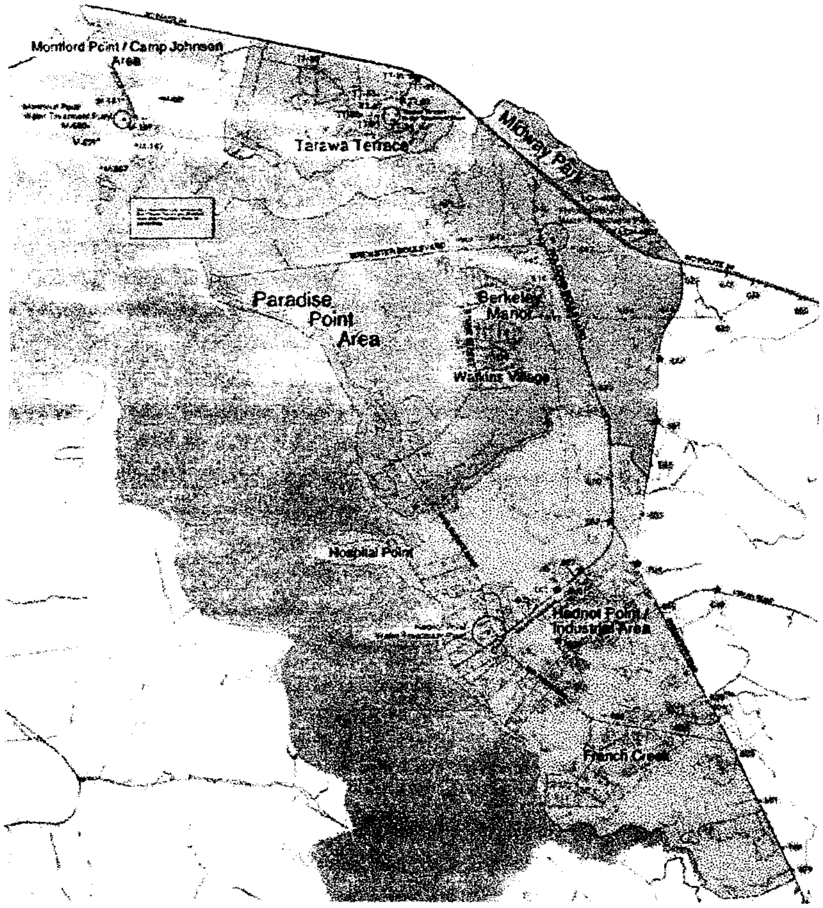
Camp Lejeune Area Maps 1968--1985

The area maps you see below are provided for informational purposes only in connection with the Agency for Toxic Substance and Disease Registry's survey of Base residents from 1968--1985. They are not intended to be comprehensive, and are not to scale.

The maps show the Camp Lejeune housing areas, those areas' water distribution systems, and the wells each system drew water from as they existed from 1968--1985. The stars on the map denote wells in which volatile organic compounds were detected. Each housing unit in each housing area was serviced by and received water from that area's water distribution system. For example, housing units in Tarawa Terrace received their water from the Tarawa Terrace water distribution system, which drew its water from the wells in Tarawa Terrace.

All current Camp Lejeune water distribution systems are tested regularly and the water is fully in compliance with all Federal and State regulations.

Click on shaded areas on the map below for additional information pertaining to that shaded area.


Montford Point / Camp Johnson Area
Tarawa Terrace
Midway Park
Paradise Point Area
Berkeley Manor
Watkins Village
Hospital Point
Hadnot Point / Industrial Area
French Creek

News Release
United States Marine Corps
Division of Public Affairs

Date: November 1, 2000
Contact: Capt Steve Butler
Telephone: (703) 614-6101
Butlersa@hqmc.usmc.mil

Marine Corps Encouraging Participation in Environmental Health Survey

HEADQUARTERS, U.S. MARINE CORPS, WASHINGTON, DC - Marine Corps officials are trying

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Depending on the results of the survey, the ATSDR may conduct a health study to enh

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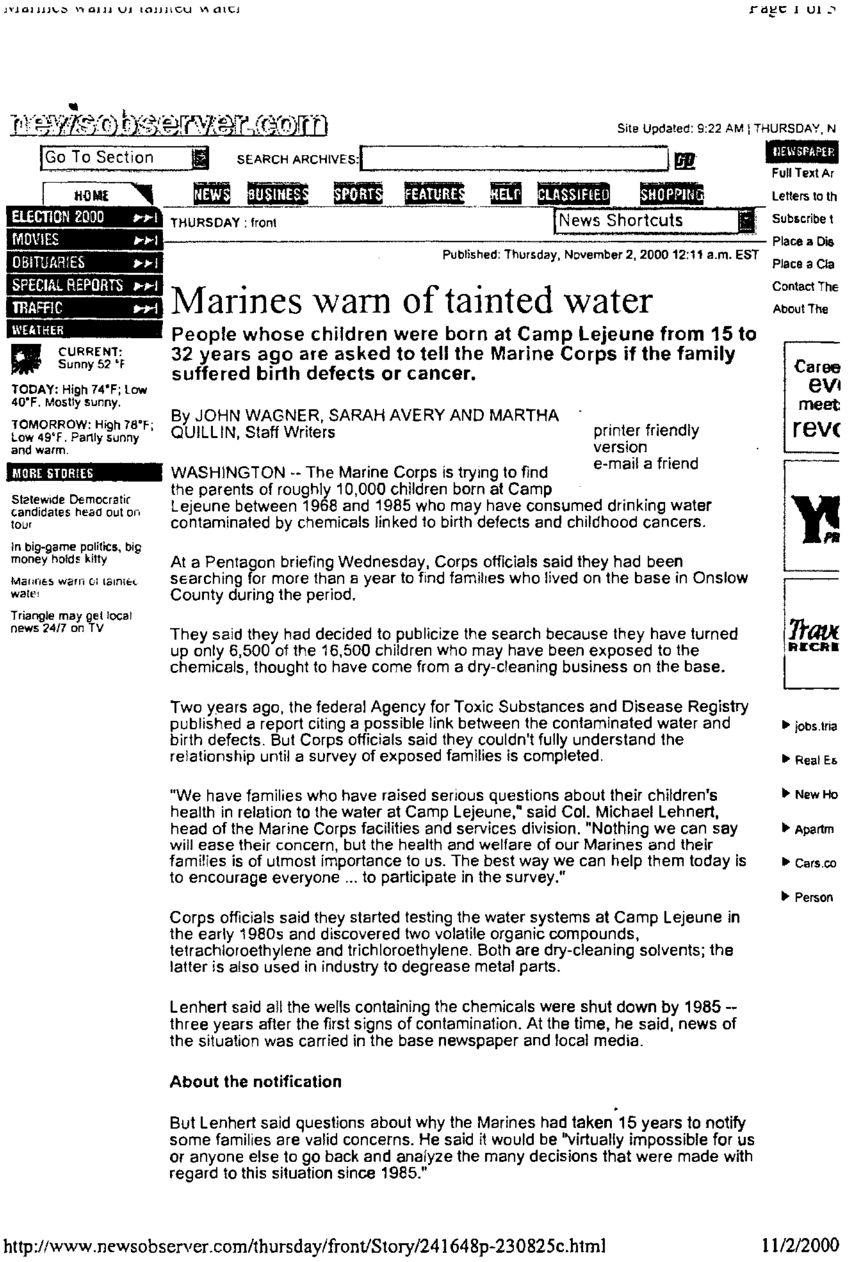

Marines warn of tainted water　　　　Page 1 of 3

CURRENT: Sunny 52 °F

TODAY: High 74°F; Low 40°F. Mostly sunny.

TOMORROW: High 78°F; Low 49°F. Partly sunny and warm.

MORE STORIES

Statewide Democratic candidates head out on tour

In big-game politics, big money holds kitty

Marines warn of tainted water

Triangle may get local news 24/7 on TV

Published: Thursday, November 2, 2000 12:11 a.m. EST

Marines warn of tainted water

People whose children were born at Camp Lejeune from 15 to 32 years ago are asked to tell the Marine Corps if the family suffered birth defects or cancer.

By JOHN WAGNER, SARAH AVERY AND MARTHA QUILLIN, Staff Writers

printer friendly version
e-mail a friend

WASHINGTON -- The Marine Corps is trying to find the parents of roughly 10,000 children born at Camp Lejeune between 1968 and 1985 who may have consumed drinking water contaminated by chemicals linked to birth defects and childhood cancers.

At a Pentagon briefing Wednesday, Corps officials said they had been searching for more than a year to find families who lived on the base in Onslow County during the period.

They said they had decided to publicize the search because they have turned up only 6,500 of the 16,500 children who may have been exposed to the chemicals, thought to have come from a dry-cleaning business on the base.

Two years ago, the federal Agency for Toxic Substances and Disease Registry published a report citing a possible link between the contaminated water and birth defects. But Corps officials said they couldn't fully understand the relationship until a survey of exposed families is completed.

"We have families who have raised serious questions about their children's health in relation to the water at Camp Lejeune," said Col. Michael Lehnert, head of the Marine Corps facilities and services division. "Nothing we can say will ease their concern, but the health and welfare of our Marines and their families is of utmost importance to us. The best way we can help them today is to encourage everyone ... to participate in the survey."

Corps officials said they started testing the water systems at Camp Lejeune in the early 1980s and discovered two volatile organic compounds, tetrachloroethylene and trichloroethylene. Both are dry-cleaning solvents; the latter is also used in industry to degrease metal parts.

Lenhert said all the wells containing the chemicals were shut down by 1985 -- three years after the first signs of contamination. At the time, he said, news of the situation was carried in the base newspaper and local media.

About the notification

But Lenhert said questions about why the Marines had taken 15 years to notify some families are valid concerns. He said it would be "virtually impossible for us or anyone else to go back and analyze the many decisions that were made with regard to this situation since 1985."

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http://www.newsobserver.com/thursday/front/Story/241648p-230825c.html　　　　11/2/2000

Efforts to notify families during the past year have included direct mail and news releases around military bases. The Corps has also set up a Web site <<>www.usmc.mil<>>.

Families who learned of the situation for the first time Wednesday were not pleased.

Justine Rang lived with her husband, Ronald, and their four children on the base at Tarawa Terrace from 1967 to 1970, when Ronald was motor transport chief. When they moved into their three-bedroom unit, their youngest child was 2 and the oldest, 9.

Rang, who was having supper at the VFW lodge in Jacksonville on Wednesday night, said the Marine Corps had not contacted her for its survey. She and her husband have had a home in Jacksonville since 1976.

Justine Rang said that her children are now scattered all over the country, and they have no serious health problems. "We've never had anything related to that that I know of," she said of the tainted water. "We've been lucky, I guess."

The Environmental Protection Agency made Camp Lejeune a national priority cleanup site in 1989.

Tainted groundwater was among three major problems contributing to its priority status. The other problems included lead that leached into tap water from old pipes in buildings, and pesticides in surface soils on the site of a former day-care center.

The report two years ago by the Agency for Toxic Substances and Disease Registry notes that the groundwater contamination was caused by leaks in underground tanks, both on the base and off. It said exposure to the chemicals might have gone back 30 years, soon after a dry cleaner opened on the base in 1954.

Where toxins were

Two housing complexes -- Tarawa Terrace and Hadnot Point -- were affected.

According to the ATSDR, the water was ingested by drinking water and by showering.

Why children are at risk

Adults aren't likely to have suffered any serious complications, given that the exposure is considered lower than at levels known to cause headache, dizziness, nausea and other problems. The risk for cancer is also considered small.

Exposure in pregnant women, however, might have contributed to such birth defects as heart malformations, neural tube defects, oral clefts and even death, according to the ATSDR.

The ATSDR began studying how the chemicals affected newborns in 1995. Of 6,000 infants whose mothers lived on the base and were exposed to the chemicals, a significant number had lower birth weight.

Camp Lejeune began operation in 1942 and covers about 233 square miles in Onslow County. It is home to six major Marine Corps commands and two Navy commands.

It also operates training schools for infantry, engineers, service support and medical support. About 43,200 active duty military personnel were stationed there in 1990, with 51,656 dependents.

A young population lives on the base, with 63 percent of the military personnel and their families between the ages of 15 and 24, and only 1 percent of the population age 60 or older.

Washington correspondent John Wagner can be reached at (202) 662-4380 or jwagner@mcclatcydc.com

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News Release

United States Marine Corps DRAFT
Division of Public Affairs

Date: November 1, 2000
Contact: Capt Steve Butler
Telephone: (703) 614-6101
Butlersa@hqmc.usmc.mil

The statement highlighted in yellow belo was dropped from the official press release because I called Major Nathaniel Faye, US PAO at the Pentagon. I told him that the only people that referred to the contamination levels in the at CLNC as "small" or "Trac have been Marine Corps offi It was time to stop!!

Marine Corps Encouraging Participation in Environmental Health Survey

HEADQUARTERS, U.S. MARINE CORPS, WASHINGTON, DC - Marine Corps officials are trying to reach about 16,500 former residents of Camp Lejeune's base housing who may have been exposed to a small amount of volatile organic compounds (VOCs) in the drinking water at the base prior to early 1985. This statement was dropped from the "official" press release because I called

The effort is being made in support of the Agency for Toxic Substances and Disease Registry (ATSDR), a public health service agency. ATSDR is attempting to survey residents who were possibly exposed to the drinking water at several of the housing areas.

The survey, which began in September 1999, is seeking parents of children born or conceived while living at base family housing at Camp Lejeune between 1968 and 1986.

If the ATSDR can locate a large enough population, they will conduct a health study that may enhance scientific understanding of the health risks associated with exposure to small amounts of volatile organic compounds (VOCs) in the water supply. It is now known that VOCs were present in two of the base drinking water systems that provided water to base housing.

The survey focuses on two specific VOCs, tetrachloroethylene (PCE) and trichloroethylene (TCE), often used in dry cleaning or as degreasers. Small amounts of those substances leaked into several Camp Lejeune water systems prior to early 1985.

Those water systems were shut down in 1985. All drinking water at Camp Lejeune is regularly tested and is safe to drink.

For the past year, Camp Lejeune and ATSDR officials have been trying to contact the former residents using a combination of methods such as direct mail, news releases around military bases, notices in military publications, and open houses. Despite these efforts, a sufficient number of people have not been located. We recognized up front, that there would be significant challenges in locating a large enough portion of the population.

In an effort to extend its media outreach to potential survey participants, Marine Corps officials in Washington are asking national news organizations to assist them in locating these former

Camp Lejeune residents and their families. "The health and welfare of Marines and their families is very important to us," said Colonel Mike Lehnert, head of the Marine Corps' Facilities and Services Division. "We have Marine families with questions that cannot be answered unless the study is completed, so it is very important to us that we do everything possible to help ATSDR reach as many of the former residents as we can." Lehnert added that it is important for all individuals who are part of the survey to participate, whether or not they have experienced any health concerns."

The 35 question health survey is conducted by telephone and attempts to gather data for use in a follow-on scientific research study about the effects that these substances may have on children when exposed before birth.

All families whose children were born or conceived at Camp Lejeune between 1968 and 1986 are encouraged to participate in this survey, whether or not the child has exhibited any health concerns. To participate, call the National Opinion Research Center (NORC) at (800) 639-4270. NORC is conducting the survey for the ATSDR.

For more information about the ongoing study, call the ATSDR at (888) 42-ATSDR, extension 5132. The Marine Corps has also established a toll free number to obtain general information. The toll free number is (877) 261-9782. All media queries should be directed to Capt Steve Butler, Public Affairs, Headquarters Marine Corps.

-30-

To: Sab@emd1 → Scott Brewer (JME)
From: GS-13 N NEAL PAUL@EMD
Originated by: GS-13 N NEAL PAUL@EMD
Cc: mps@EMD,tsm@EMD
Bcc:
Subject: fwd: "A Civil Action" New Movie on the Superfu...
Attachment:
Date: 10/15/98 12:36 PM

Scott,
We will be briefing Maj Jack in early November - he will be in Italy until then. Tom is working on a point paper to document the events that have occurred since 1984. I feel its important for Maj Jack to know the entire story prior to advising us. Will continue to keep you posted.
V/R,
neal

ps. it appears we have put-off the questionairres being mailed until at least Feb 99. They infact, succeeded in delaying the beginning of the ATSDR's survey (Phase 1) until October 1999. This delay was all because of a Hollywood movie ??!! (J.M.E.)

Original text
From: GS-13 N NEAL PAUL@EMD@MCB LEJEUNE, on 10/12/98 10:36 AM:
To: GS-14 SCOTT A BREWER@EMD1@MCB LEJEUNE
Cc: jsw@EMD@MCB LEJEUNE, MAJ SCOTT B JACK@CPAO@MCB LEJEUNE, mps@EMD@MCB LEJEUNE, tsm@EMD@MCB LEJEUNE

Scott,
With respect to the history campaign, since most folks no longer live in the area, we won't reach the formerly effected community. We would be able to educate our local community and this may help. ATSDR will be sending out questionaires with the next year and I need to see what info they will be including. My plans are to brief Maj Jack and get his thoughts. I'll keep you posted.
Thanks,
Neal

From: GS-14 SCOTT A BREWER@EMD1@MCB Lejeune, on 10/2/98 12:54 PM:
Neal: I suspect we're in for a lot of questions between this movie, and the (likely) upcoming ATSDR's study of the past TCE contamination. The real facts are hard enough to convey... i can't wait to see the Hollywood version. Should we begin a campaign of putting out the history (and/or other information) ahead of time? v/r sab

----
From GM-15 ROBERT L WARREN@EMD1@MCB Lejeune, on 10/1/98 8:03 AM:
To: GS-14 SCOTT A BREWER@EMD1@MCB Lejeune

Comments:
Forwarded for you information

v/r
Gena

- - - - - - - - - - - - - - - Original Message - - - - - - - - - - - - - - -
To: SMTP[abell1d@clb.usmc.mil], SMTP[ecrabill@ida.org],
SMTP[chiapelo@erols.com], SMTP[caburkho@mwbb.com],
SMTP[Gary_C_Lehmann@notes.hqi.usmc.mil],
SMTP[kurtz.jon@hq.navy.mil],
FORCE[BBEM08@CLBMCB02@GGSNAD0C], FORCE[GS-12 JULIE A
SHAMBAUGH@EMD@MCB LEJEUNE], MAJ FRED C MOCK@NATURAL RES@MCB
QUANTICO, smtp2[christmanpa@pendleton.usmc.mil]
Cc: SMTP[akasbeer@nvl.army.mil]
From: GS12 THIERRY L CHIAPELLO@AM@MARCORSYSCOM
Date: Friday, October 2, 1998 at 5:54:09 am EDT
Attached: Headers.822, ATTRIBS.BND

FYI and a Friday night in December with popcorn.

TL Chiapello
Head, Environmental and Explosives Safety Branch
Program Manager for Ammunition
MARCORSYSCOM
DSN: 426-0951
Comm: (703) 696-0951
Email: chiapellot@quantico.usmc.mil
-------------
Original Text
From: "Van Brocklin, Connie H., Ms., ACSIM" <VanBrCH@hqda.army.mil>, on 10/1/98 03:49 PM:
To: SMTP@HQIINET01@Servers["Elliott, Martin G., Mr., ACSIM" <EllioMG@hqda.army.mil>], SMTP@HQIINET01@Servers["Alexander, Tim" <taalexan@aec2.apgea.army.mil>], SMTP@HQIINET01@Servers["Anderson, Allan @ INSCOM" <a-anderson_mantech@msn.com>], SMTP@HQIINET01@Servers["Baetz, Linda" <linda_baetz_at_chppm2__apgea@chppm-ccmail.apgea.army.mil>], SMTP@HQIINET01@Servers["Bell, Dave @ TRADOC" <belld@monroe.army.mil>], SMTP@HQIINET01@Servers["Carlisle, George" <IMCEAMS-ROSSLYN_ODEP_carlisle@hqda.army.mil>], SMTP@HQIINET01@Servers["Cogdill, Grady" <grady_cogdill@hq.dla.mil>], SMTP@HQIINET01@Servers["Cushman, George" <GeorgeC@hqda.army.mil>], SMTP@HQIINET01@Servers["Egan, MAJ Michael" <EganMA@hqda.army.mil>], SMTP@HQIINET01@Servers["Eide, Randy" <randy.eide@af.pentagon.mil>], SMTP@HQIINET01@Servers["Eng, William" <EngWF@hqda.army.mil>], SMTP@HQIINET01@Servers["Fenlason, Bob, at CPW" <bob.w.fenlason@cpw01.usace.army.mil>], SMTP@HQIINET01@Servers["Foskey, Karen" <foskeyk@n4.opnav.navy.mil>], and others...

> For your information.
>
> This December, a movie will be released that will raise serious issues
> about ground water contamination and the safety of public water supplies

> That movie, called a "A Civil Action" and starring John Travolta and
> Robert Duvall, is based on the best-selling book of the same title by
> Jonathan Harr (published by Random House). The book is about a toxic tort
> lawsuit filed by several families from Woburn, Massachusetts, and the
> trail against two large corporations for deaths resulting from leukemia
> and other illnesses allegedly caused by TCE found in the ground water.
> These families lived in an area served by two Woburn public water supply
> wells (wells G and H). These two wells were installed in the mid-1960s
> and shut down in 1979, following an apparently unrelated incidence of
> illegal dumping in the vicinity. Sampling of the wells immediately prior
> to shutdown revealed the presence of 267 ppb TCE in well G and 183 TCE in
> well H, as well as lesser concentrations of PCE and other chlorinated
> organic compounds. In 1982, a lawsuit was filed against three
> corporations with manufacturing facilities in the area surrounding wells G
> and H. Following extensive site investigations and settlement with one of
> defendants, the trail against the final two defendants was held in Boston
> in 1986.
>   A Civil Action is an excellent chronicle of the extraordinary
> efforts of Jan Schlichtmann, the attorney from a very small law firm who
> represented the plaintiff families against the resources and influence of
> two of largest firms in Boston and their clients. The book describes the
> difficulties and extensive studies by Schlichtmann's medical experts to
> evaluate possible link between TCE in ground water and the leukemia
> clusters in Woburn.
>   The primary focus of the first trial was the expert witness
> testimony of provided by five well-known hydrogeologists, ground water
> hydrologists, and a geochemist. As you can image, the various experts
> providing conflicting opinions about the sources and timing of
> contamination.
>   I recommend that each of you see the movie or read the book.
>   The movie will undoubtedly increase the public's awareness of ground
> water, but it also may cause serious concerns about the safety of ground
> water for public water supply wells. As Jim Goodrich, executive director
> of California's San Gabriel Basin Water Quality Authority wrote, the movie
> raises may issues for public water utilities, regulatory agencies,
> legislatures, consultants, the public, and the courts. An increasing
> number of toxic tort lawsuits are being filled against both industry and
> water utilities for real and potential future health effects caused by
> exposure to industrial chemicals in groundwater.
>
> Portions of the above taken from "The Newsletter of the Association of
> Ground Water Scientists and Engineers".
>
>
>
>

ATSDR

To: SMTP2@SMTP2[<dreyerk@hqi.usmc.mil>]
From: GS-13 N NEAL PAUL@EMD
Cc:
Bcc: GS-9 THOMAS S MORRIS@EMD
Subject: re: CAMP LEJEUNE PUBLIC HEALTH STUDY
Attachment:
Date: 10/23/98 8:13 AM

Good morning,
Whose public relations plan are you referring to here? Do we, the USMC, plan on implementing any PR efforts prior to the questionaires being sent ? Mick and I are briefing our PAO (in Italy now) in the beginning of Nov.

Just a thought, with the movie coming out in Dec, can we delay the questionaires until April/May time frame?

I've had an interesting week wrt LUCs? It appears we are close, waiting on Bernie to approve yearly certifcation language that will go in the ROD. Jon Johnston says he, Berniek, has already lost this battle in FL. If you look at the MOA, activities are required to provide an annual report to EPA/State certifying the LUCs are in place.

I definitely ruffled some feathers within EpA's ranks but I've talked to Jon smoothed things over. Jay Bassett was the instigator. ONe IMPORTANT NOTE, Jon feels like since Yaroschak, OLson and Elsie approve of MOA that this will be DoN policy, therefore he expects all Marine Corps activities to acquiesce to this adhoc policy. Did these folks ever brief you or include you on these discussions/ staffing of the LUCAP or were you on pregnancy leave at the time? This policy, albeit one that makes sense and is better than our BMPs, may not be accepted by all states in the region. I'm thinking specifically of Albany and PI. Should I take the lead on this, from a REC standpoint, and iniate the LUCAP at these activities or will you be doing that?

Let me know your thoughts - I'll be on a conf call at 9 to discuss with EPA and other TIer 3'ers.
Respectfully,
Neal

Original text
From: "GS13 KELLY A DREYER" <dreyerk@hqi.usmc.mil>, on 10/23/98 8:09 AM:
Capt. Newman,

I called to return your call this morning. I will be in today and most of next week. Please give me a call.

STATUS OF CAMP LEJEUNE PUBLIC HEALTH STUDY

The Base prepared and provided a chronology of events that led up to the

0558

Water Survey
Page 1 of 2

Camp Lejeune Area Water Survey

An agency of the US Department of Health and Human Services is conducting a survey that Marines, Sailors and their family members who may have lived aboard Camp Lejeune between 1968 and 1985 should know about. The Toxic Substance and Disease Registry (ATSDR), a part of the Public Health Service, is looking for women who were pregnant between 1968 and 1985 and lived in base housing aboard Camp Lejeune. The study has to do with substances called volatile organic compounds or VOCs. VOCs are often used as cleaners and degreasers. The specific substances that ATSDR is interested in this survey are tetrachloroethylene (PCE), a commonly used dry cleaning solvent and tricholorethylene (TCE), a degreaser (chemical cleaner). These substances were found in the water distribution systems in Tarawa Terrace and Hospital Point in the early 1980's.

The survey is an attempt to gather scientific evidence about the effects that these substances may have on children that were in utero during this time. Although some studies have been done in the past, the results so far have been inconclusive. This survey will add to the body of scientific knowledge about these substances.

The VOC's in the early 80's at Tarawa Terrace originated from an off-base dry cleaner. The VOCs found in the water at Hospital Point came from underground storage tank leaks and common past disposal practices in the Hadnot Point industrial area. They were found in the water distribution system during routine water testing. At that time, no federal or state regulations existed for VOCs found in water. All 12 wells that were ~~found to contain these substances~~ were closed and capped in 1985. Since then, water to Tarawa Terrace has come from the Holcomb Boulevard water treatment plant. This and all water is tested regularly to ensure the water is safe to drink and complies with all federal and state standards.

If you or someone you know was pregnant and lived aboard Camp Lejeune between 1968 and 1985, you are encouraged to participate in this survey. Call the National Opinion Research Center (NORC), the organization conducting the survey for ATSDR, at 1 800 639 4270. For more information about the study or about VOCs, call ATSDR at 1 888 42 ATSDR or visit their website at

CLW

http://www.lejeune.usmc.mil/water.htm
10/19/99

Many of us have dedicated quite a bit of time trying to find a way to get the needed information. During the conference call I hope to pull a wide variety of expertise together to share information, ask questions and come to a conclusion on the best course of action that should be taken to get the best product possible.

From what I understand, the present dilemma deals with restrictions in the Privacy Act which are designed to protect the privacy of those individuals which are not part of the study (Apparently, there are civil and criminal penalties for noncompliance with it). The purpose of the call is to work through the issues and solve the problem.

We, the Marine Corps are fully on board with the effort and continue to support it. I look forward to our call and working on this issue. Please let me know if you have any ideas -

Talk to you soon,
Kelly Dreyer
Environmental Restoration Program Manager
HQ Marine Corps
DSN 225-8302, ext 3329
COM (703) 695-8302, ext 3329
dreyerka@hqmc.usmc.mil

ATSDR Public Affairs

-----Original Message-----
From: Skipper, Kathy [mailto:bos1@cdc.gov]
Sent: Friday, April 09, 1999 3:47 PM
To: 'Dreyer GS13 Kelly A'
Subject: RE: Camp Lejeune Health Study Conference Call

15th ok anytime. Also anytime 21 or 22.

Kelly, some personal thoughts:

We very much need to work out a way that this can happen. With OMB approval a "done deal," this whole issue could prove very embarrassing and problematic for the Marine Corps if the public perception is that names aren't being provided or needed information isn't being provided "proactively." As a former military PAO and one married to a retired officer, I feel a strong allegiance to the military community and don't want to see this thing go in this direction.

However, you need to know that full page ads for the Federal and Navy Times, and other publications are being discussed. I think you and I both know how this would "play in Peoria" not to mention inside the beltway. What can I do to help prevent this scenario from developing?

To: jsw@EMD,mps@EMD,SMTP[landmankh@efdlant.navfac.navy.mil]
From: GS-13 N NEAL PAUL@EMD
Originated by: GS13 KELLY A DREYER <dreyerk@hqi.usmc.mil>
Cc:
Bcc:
Subject: fwd: Camp Lejeune Public Health Study
Attachment:
Date: 9/28/98 7:48 AM

here's the latest on ATSDR and contaminated drinking water...

Original text
From: "GS13 KELLY A DREYER" <dreyerk@hqi.usmc.mil>, on 9/25/98 4:37 PM:
To: SMTP1@SMTP1@MCB LEJEUNE[<Geoffrey_B_Higginbotham@notes.hqi.usmc.mil>]
Cc: SMTP1@SMTP1@MCB LEJEUNE[<munsell.elsie@hq.navy.mil>], SMTP1@SMTP1@MCB LEJEUNE[<olsond@n4.opnav.navy.mil>], SMTP1@SMTP1@MCB LEJEUNE[<yaroschak.paul@hq.navy.mil>], SMTP1@SMTP1@MCB LEJEUNE["SES2 PAUL C HUBBELL" <hubbellp@hqi.usmc.mil>], SMTP1@SMTP1@MCB LEJEUNE["BGEN J MIKE HAYES" <hayesj@hqi.usmc.mil>], SMTP1@SMTP1@MCB LEJEUNE["larson" <larson%LFL%HQMC@hqi.usmc.mil>], SMTP1@SMTP1@MCB LEJEUNE["weirick" <weirick%LFL%HQMC@hqi.usmc.mil>], SMTP1@SMTP1@MCB LEJEUNE["sakai" <sakai%LFL%HQMC@hqi.usmc.mil>]

Sir,

As requested, the answer to your question on the contaminant levels at Camp Lejeune and the outcome of my meeting with the Office of Management and Budget (OMB) on the proposed Camp Lejeune Health Study is provided for your information. 3 June 2007 – Please note the singular "well", it was (2) wells. The 80-215 ppb was at the Tap, The well was 1,580ppb! yoke

(1) The levels of contamination in the drinking water well ranged from 80-215 ppb. The maximum contaminant level for this type of solvent contamination (PCE) is 5 ppb. This standard is based on an individual consuming large amounts of contaminated water over a lifetime (30 years minimum). Therefore the likelihood of adverse health effects on an adult is small (even for someone who served three tours of duty there).

ap water

The effects of this type of contamination on unborn children is unknown and is why the Agency is so interested in studying Camp Lejeune.

(2) Summary of the meeting with OMB:

SUBJECT: Proposed Camp Lejeune Public Health Study to determine if there is a link between exposure to solvent contaminated drinking water and childhood leukemia The original lie about Tarawa Terrace wells was that the TT new "well (TT-23) was discovered to b contaminated immediately upon construction (1983) and never pu into service. This well was used from its construction until May 1 '86,

ATTENDEES: Representatives from OMB, the Navy Environmental Health Center (NEHC), Naval Facilities Engineering Command (NAVFAC), U.S. Army Center f Health Promotion & Preventative Medicine (USACHPPM), and the Agency for Toxic Substances and Disease Registry (ATSDR).

PURPOSE: To provide OMB information to assist in approval of the subject study.

SUMMARY:

(1) OMB will approve a Public Health Study which will be conducted at MCB Camp Lejeune .

(2) Study will be conducted in 3 phases: (1) information collection, (2) medical record verification, and (3) analysis of data. OMB will review each phase of the study prior to approving the next phase and will coordinate with attendees listed above to ensure concerns/comments are addressed. If initial data does not indicate there is a problem, the study will not progress to the next stage.

(3) ATSDR will be given access to Social Security Numbers, last known addresses and/or current tour of duty for individuals who resided at Camp Lejeune between 1968 and 1986 in order to contact families of children who may have been born during that period.

(4) ATSDR is funding first two phases of the study and will request DON funding assistance for third phase. [DON should not pay for this study as it did not cause the contamination. This issue will be discussed if phase three becomes necessary. At this point, we do not believe that the initial data will show cause to continue the study beyond phase 1.] 3 June 2007 – They tried their hardest to de-rail this survey/study. 1st

NEXT STEPS: They refused the funding (Based upon a Lie), 2nd they delayed The DMDC from Fulfilling ATSDR's data requests based on privacy act issues.

(1) Marine Corps Public Affairs Office will review survey which will be sent to former Lejeune personnel and provide comment by 30 Sep 98.

(2) LFL will coordinate a meeting between the appropriate Privacy Act and ATSDR personnel to determine the best method of obtaining social security numbers and addresses.

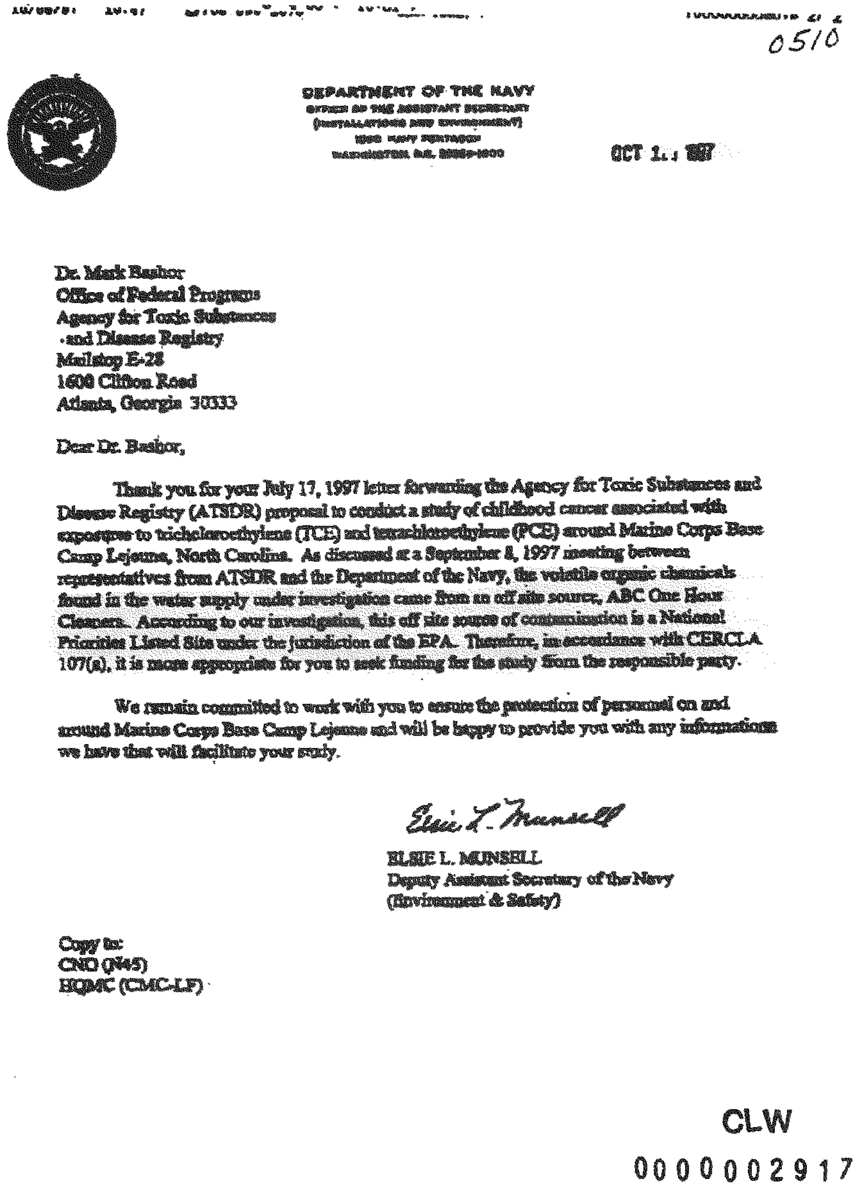
(3) Expect OMB to approve study on 30 Sep 98.

Continued

It wasn't until October 2000 when the ATSDR threatened a nation-wide "media blitz" that the U.S.M.C. started to operate.

I am available to brief you further at your convenience.

~~Very Respectfully,~~
~~Kelly Dreyer~~
695-8302



[illegible]

0510

DEPARTMENT OF THE NAVY
OFFICE OF THE ASSISTANT SECRETARY
(INSTALLATIONS AND ENVIRONMENT)
1000 NAVY PENTAGON
WASHINGTON, D.C. 20350-1000

OCT 1[illegible] 1997

Dr. Mark Bashor
Office of Federal Programs
Agency for Toxic Substances
and Disease Registry
Mailstop E-28
1600 Clifton Road
Atlanta, Georgia 30333

Dear Dr. Bashor,

Thank you for your July 17, 1997 letter forwarding the Agency for Toxic Substances and Disease Registry (ATSDR) proposal to conduct a study of childhood cancer associated with exposure to trichloroethylene (TCE) and tetrachloroethylene (PCE) around Marine Corps Base Camp Lejeune, North Carolina. As discussed at a September 8, 1997 meeting between representatives from ATSDR and the Department of the Navy, the volatile organic chemicals found in the water supply under investigation came from an off site source, ABC One Hour Cleaners. According to our investigation, this off site source of contamination is a National Priorities Listed Site under the jurisdiction of the EPA. Therefore, in accordance with CERCLA 107(a), it is more appropriate for you to seek funding for the study from the responsible party.

We remain committed to work with you to ensure the protection of personnel on and around Marine Corps Base Camp Lejeune and will be happy to provide you with any informations we have that will facilitate your study.

Elsie L. Munsell

ELSIE L. MUNSELL
Deputy Assistant Secretary of the Navy
(Environment & Safety)

Copy to:
CNO (N45)
HQMC (CMC-LF)

0490

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

JUL 16 1997

Elsie L. Munsell
Deputy Assistant Secretary of the Navy (Environment and Safety)
Office of the Assistant Secretary (Installations and Environment)
1000 Navy Pentagon
Washington, D.C. 20350-1000

Dear Ms. Munsell:

I am writing to express my concern regarding information discussed at a recent workgroup meeting held June 23 between representatives of the Agency for Toxic Substances and Disease Registry (ATSDR) and the Department of Defense (DOD), including representatives of the Naval Environmental Health Center (NEHC). The concerns revolve around an apparent reluctance to provide funding to support a study of childhood cancer associated with exposures to trichloroethylene (TCE) and tetrachloroethylene (PCE) at Marine Corps Base - Camp Lejeune, NC. It appears that some of this reluctance may be attributable to a lack of understanding regarding the need and requirement for the study.

ATSDR's investigation indicates that more than 6,000 children were probably exposed to TCE and PCE *in utero* between 1968 and 1985 in base housing at Camp Lejeune. Based on an epidemiologic study recently completed by the Massachusetts Department of Public Health in the town of Woburn, Massachusetts, there is evidence indicating that these children exposed to TCE and PCE may be at increased risk of adverse health effects.

The Woburn study observed an association between the mother's potential for exposure to TCE and PCE in drinking water and childhood leukemia, particularly when exposure occurred during pregnancy. To our knowledge, no other study has explicitly examined the potential association between these environmental contaminants and childhood leukemia. Although the solvent mixture was slightly different at Woburn than at Camp Lejeune, the levels of solvents found in the drinking water at Camp Lejeune were comparable to, or higher than, the solvents found in wells at Woburn.

Although a single epidemiologic study can rarely if every establish causality in absence of other evidence, the association observed at Woburn was unusually strong, specific to exposure during pregnancy, and consistent with a dose-response relationship between potential exposure and the cancer risk. In light of the findings of the Woburn study and in absence of evidence to the contrary, we feel that there is a substantial possibility that the children exposed to solvents *in utero* at Camp Lejeune are at increased risk of childhood cancer.

Section 104(i)(7)(B) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) states in part "Whenever in the judgment of the Administrator of ATSDR it is appropriate on the basis of the results of such pilot study or other study or health assessment, the Administrator of ATSDR shall conduct such full scale epidemiological or other health studies as may be necessary to determine the health effects on the population exposed to hazardous substances from a release or threatened release." Based on the findings of the public health assessment and the study of pregnancy outcomes conducted on the base, ATSDR has determined that a health study of the association between exposure to TCE and PCE and childhood cancer is warranted. Under Section 107 and 120 of CERCLA, DOD is liable for the cost of this study.

I am enclosing a copy of the health study proposal developed by ATSDR to investigate the potential relationship between exposure to volatile organic compounds in drinking water and childhood leukemia at Camp Lejeune. I am also including a copy of the study conducted at Woburn.

ATSDR is currently negotiating the Fiscal Year 1998 Annual Plan of Work with Department of Defense representatives. The funding for conducting this study has been included into those negotiations. We would appreciate your assistance in ensuring that adequate funds are provided so that this important health study can be conducted.

Sincerely yours,

Joseph L. Hughart for
Mark M. Bashor, Ph.D.
Associate Administrator for
Federal Programs
Director, Office of Federal Programs

cc:
Andrea Lunsford, NEHC
Bill Judkins, NAVFAC
Kathleen Buchi, Ph.D., USACHPPM

0624

Raines GS12 Rick H

From: Dreyer GS13 Kelly A
Sent: Friday, March 16, 2001 11:16 AM
To: Raines GS12 Rick H
Cc: Paul GS13 Neal N; Sakai GM14 Craig K; Jungreis Capt Jeremy N; Reed Jr Maj Leslie H; James Brennan (E-mail); Baker GM13 Carl H
Subject: REQUEST FOR CLARIFICATION

Rick,

As we discussed earlier, here is a summary of what I see needs to be clarified and sent to ATSDR in writing. The Royal Netherlands Navy also requested the same information.

I am aware that you and Carl have already put most of these items together, but prior to releasing them, let's make sure they are accurate. It would also be useful to know what reports the new data contradicts. For starters, I am aware that the 1998 ATSDR report has some incorrect well construction dates, and mistakenly assumes that the Holcomb Blvd plant always supplied water to certain housing areas. There may also be other reports, correspondence, etc that needs to be clarified.

Areas which require research/clarification/documentation

(1) Which water supply systems served which base locations (including housing areas) from construction/operation to present?
(2) When were wells that supplied water systems constructed, closed, sampled, and what were the results?
(3) Where are all the present/former Dry Cleaners located on base? Which ones were merely drop off points?
(4) Where are other suspected sources of TCE/PCE on base (i.e. motor pool areas, UST areas, etc.)

Don't limit your analysis to TT and Hadnot point areas, we also need information from MCAS, Camp Geiger, etc.

In addition to setting the record straight, this information will help us answer questions on the Toll free line as well as provide written responses to the numerous citizen and congressional inquiries we receive.

I appreciate your help and look forward to hearing about the conclusion of this issue from Oregon.

VR (and best wishes always),
Kelly

2 June 2007

This is the same information that she directed/requ to be corrected in November 2000 (See CLW 3243). The only difference is that this time she is requesting it from Mr. Raines, Neal Pauls subordinate.

Raines GS12 Rick H

From: Paul GS13 Neal N
Sent: Thursday, November 16, 2000 9:41 AM
To: Cone GM14 Frederick E
Cc: Brewer GS14 Scott A; Raines GS12 Rick H; Jungreis Capt Jeremy N
Subject: Water Distribution Systems at Camp Lejeune

Fred,
See CMC HQ's request. Please let me know when you can meet on this.

-----Original Message-----
From: Dreyer GS13 Kelly A
Sent: Thursday, November 16, 2000 9:40 AM
To: Paul GS13 Neal N
Cc: Sakai GM14 Craig K; Raines GS12 Rick H
Subject: Water Distribution Systems at Camp Lejeune

Neal -

There seems to be a little confusion regarding when each of the water distribution systems at Camp Lejeune were installed and the timeframe and area each of them served. It's important to set the record straight.

[illegible]

Can you please work with Facilities to compose a memo from Camp Lejeune to ATSDR with a copy to CMC and NEHC that contains the following information:

(1) All water Distribution systems
(2) When each water distribution system was built
    (a) which wells are connected to which water distribution system
    (b) which wells were contaminated (when and what were the levels)
    (c) Which wells were closed
(3) What areas each water distribution provided water to (housing, administrative, etc.)
    (a) the number of housing units in each housing area
    (b) Bldg numbers for Administrative buildings
(4) The timeframe each water distribution provided water to the specific area
(5) Any other pertinent information about a distribution system (e.g. Holcomb blvd was shut down and connected to the Hadnot Point system for 9 days),
WHAT WELLS SHUT DOWN / THEN KEPT ON LINE

If possible, an easy to read table would be a great format to present the information in. I'd like to have the memo signed out by 1 Dec 00 at the latest. Please let me know if you need clarificaiton or are not able to meet the deadline. I really appreciate your assistance. It's important to get this information to ATSDR so they can prepare an accurate report and also update previous studies that may be incorrect.

↓ 2 June 2007

If this was so important (which it was why didn't Ms. Dreyer ensure that her requests were carried out? Four mo later, she repeats her request. (CLW 33

VR,
Kelly Dreyer
Environmental Restoration Program Manager
HQ Marine Corps
DSN 225-8302, ext 3329
COM (703) 695-8302, ext 3329
dreyerka@hqmc.usmc.mil

- DOES SHE WANT DIST. SYS' NOT INCLUDED IN STUDY / TIME FRAME

→

- DO WE NEED 3rd PARTY REVIEW
- SLIDE ON DATE | UPDATE BY NEXT WEEK
- BARRACKS |

HEADQUARTERS, MARINE CORPS BASE, CAMP LEJEUNE

ACTION BRIEF Date: 1 MAR 1985

Staff Section: Assistant Chief of Staff, Facilities

Subj: ALTERNATIVES FOR PROVIDING WATER TO THE TARAWA TERRACE AREA

Problem: Because of the recent shutdown of two water wells in the Tarawa Terrace water system due to the presence of Volatile Organic Chemicals (VOC) in the raw water, sufficient well capacity is not expected to be available to satisfy water demand this summer. A shortage of 300,000 gpd (gallons per day) is expected this spring/summer if the present situation remains unchanged.

Background/Discussion: The following alternatives are listed as possible options for addressing the problem.

a. Alternative 1: New well, Tarawa Terrace. Estimated cost: $80,000.

Advantages: Increase capacity by 100 gpm to 250 gpm (gallons per minute).

Disadvantages: Based on recent new wells and test wells in Tarawa Terrace, water in significant quantitities is difficult to locate (e.g., well TT-25 is producing approximately 100 gpm although designed for 150 gpm. New well would be abandoned after completion of expansion of Holcomb Blvd plant in approximately two years. Wells in Montford Point area are high in iron content. Construction of a new well by spring is questionabl- but could possibly be completed.

b. Alternative 2: Transport water via tanker trucks from other Camp Lejeune plants. Assume hauling 300,000 gpd with 5,000 gallon tankers which would require 60 trips per day. Assuming a tanker can make 12 trips per day, a total of five tanker trucks would be required. Estimated cost: $2,000 per day.

Advantages: Timely method of providing water.

Disadvantages: Logistics of loading/unloading/ transporting; nonavailability of trucks.

c. Alternative 3: Tap to City of Jacksonville water line on Lejeune Blvd. Informal discussion with city officials indicates they probably could not provide 300,000 gpd at this time. No costs for taps or rates were quoted. A water line under Lejeune Blvd would have to be constructed. Estimated cost: Unknown.

Advantages: Timely response to problem, if available.

CLW

2 June 2007

alternative #3 was the quickest and most feas method to resolve this situation. That is if the health and welfare of their people truly was their #1 priority. Unfortunately it was not

Subj: ALTERNATIVES FOR PROVIDING WATER TO THE TARAWA TERRACE AREA

Disadvantages: Problems associated with connecting separate systems. Chance of requests for reciprocating favors from the City of Jacksonville would increase. VOCs in the city system could be higher than we are now facing.

2 June 2007
This State
was B.S.
intended 2
discourage
any suppo
for this op
J.M.E.

d. Alternative 4: Change schedule of Holcomb Blvd plant contract to construct the water line to Tarawa Terrace immediately. The expansion of the Holcomb Blvd plant includes running a water line to TT and Camp Johnson. Contract has been awarded. Estimated cost: Unknown (additional cost to contractor).

Advantages: No unnecessary construction would be required.

Disadvantages: Serious doubts exist that contractor would complete line prior to high usage months. Line serving Tarawa Terrace is a 16" submerged line across Northeast Creek.

e. Alternative 5: Construct 8" water line from Brewster Blvd to Tarawa Terrace. Line could be tied to the railroad trestle to cross Northeast Creek. Estimated cost: $75,000.

Advantages: Timely response to problem.

Disadvantages: Problems related to material procurement and construction could surface. The temporary line may require State approval. Pressures and elevations of the two systems have been investigated to determine feasibility.

f. Alternative 6: Modify Tarawa Terrace plant to include aeration or granular activated carbon (GAC) capable of removing VOCs. Estimated cost: $300,000.

Advantages: Removal of VOCs would eliminate the problem.

Disadvantages: The modifications could not be made in the time frame required. The Tarawa Terrace plant will be discontinued upon completion of Holcomb Blvd plant expansion.

g. Alternative 7: Turn on contaminated wells that have been shut down if required to maintain adequate water levels. Estimated cost: None.

2 June 2007
This option was used
J.M.E.

Advantages: Adequate quantity of water could be provided.

Disadvantages: Although no maximum contaminate levels have been set for VOCs and no regulations presently prevent using water containing VOCs, the potential health hazards must be weighed against the need and cost of providing water from other sources.

Subj: ALTERNATIVES FOR PROVIDING WATER TO THE TARAWA TERRACE AREA

Recommended Action: Alternative 5, construct 8" line from Brewster Blvd to Tarawa Terrace. Preliminary engineering study indicates this would provide approximately 250 gpm (360,000 gpd).

2 June 2007 — This line was constructed, and according [illegible] results of the 1980s [illegible] modeling. [illegible] ! [illegible]

Advantages:

(1) Timely - target date for completion 1 June 1985.

(2) Availability of water - can draw from Holcomb Blvd and Hadnot Point system.

(3) Auxiliary line for future use during repair/maintenance of other system.

(4) Minimum cost.

(5) Potential future use to return raw water from Tarawa Terrace wells.

Very respectfully,

M G Lilley
M. G. LILLEY
AC/S, Facilities

Decision on Recommended Action:

CS Concur ____________ Nonconcur ____________

CG Approved ____________ Disapproved ____________

Need more info as we discussed

inf. 1143

UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U . . N C L A S S I F I E D . . U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

CORRECTED COPY

ROUTINE

R 091431Z MAY 85 PSN 611190N18

FM CG MCB CAMP LEJEUNE NC

TO CMC WASHINGTON DC

INFO LANTNAVFACENGCOM NORFOLK VA NAVHOSP CAMP LEJEUNE NC

UNCLAS //N06280//

CMC FOR LFL1 LANTDIV FOR 614: NAVHOSP FOR PMU
SUBJ: ANALYSES OF CAMP LEJEUNE WATER SUPPLY

A. CG MCB CAMP LEJEUNE NC 082305Z FEB 85

1. THIS MSG PROVIDES UPDATED STATUS OF SUBJ AS INDICATED IN REF AND ACTIONS TAKEN TO DATE:

A. EIGHT WELLS IN HADNOT POINT SYSTEM AND TWO WELLS IN TARAWA TERRACE (TT) SYSTEM REMAIN OFF-LINE DUE TO PRESENCE OF VOLATILE ORGANIC CHEMICALS (VOC) EXCEPT FOR TT NEW WELL AS DISCUSSED BELOW.

B. CONSTRUCTION BEGAN ON 29 APR FOR THE AUXILIARY RAW WATER LINE TO THE TARAWA TERRACE SYSTEM; EST COMPLETION DATE IS 1 JUN 85.

C. WATER CONSERVATION MEASURES HAVE BEEN ESTABLISHED FOR THE TT SYSTEM TO ALLOW THE SYSTEM TO MEET WATER DEMANDS PENDING COMPLETION OF THE CONSTRUCTION.

D. THE TT NEW WELL, WHICH HAD BEEN CLOSED FOLLOWING DETECTION OF VOC, WAS USED ON 22,23 AND 29 APR TO MAINTAIN WATER PRODUCTION AND AVOID SYSTEM SHUTDOWN. ON EACH OCCASION, VOC ANALYSES OF TT FINISHED WATER BY THE LANTDIV CONTRACT LABORATORY INDICATED CONCENTRATIONS LESS THAN THE DETECTION LIMIT OF 10 PPB.

E. A PRESS RELEASE REGARDING THE VOC SITUATION HAS BEEN ISSUED.

F. ADDITIONAL MONITORING AND LOCATION OF THE SOURCE OF VOC'S HAS BEEN PURSUED THROUGH THE NACIP PROGRAM BY LANTDIV; A SCOPE OF WORK FOR THE SECOND ROUND SAMPLING HAS BEEN JOINTLY REVIEWED BY MCB AND LANTDIV; NACIP SAMPLING IS ANTICIPATED TO BEGIN IN JULY AND AUGUST.

G. LIMITED CAPABILITY IS ANTICIPATED TO BE AVAILABLE IN JUNE FOR VOC ANALTSES BY THE CAMP LEJEUNE WATER QUALITY CONTROL LABORATORY, NATURAL RESOURCES AND ENVIRONMENTAL AFFAIRS DIVISION.

DLVR:LANTNAVFACENGCOM NORFOLK VA(15)...INFO

RTD:000-000/COPIES:0015

611190/130 1 OF 2 MATA0973 130/06:27Z 091431Z MAY 85
SSN:AUIA00917 130/06:27Z CG MCB CAMP LE

82 9 1 43

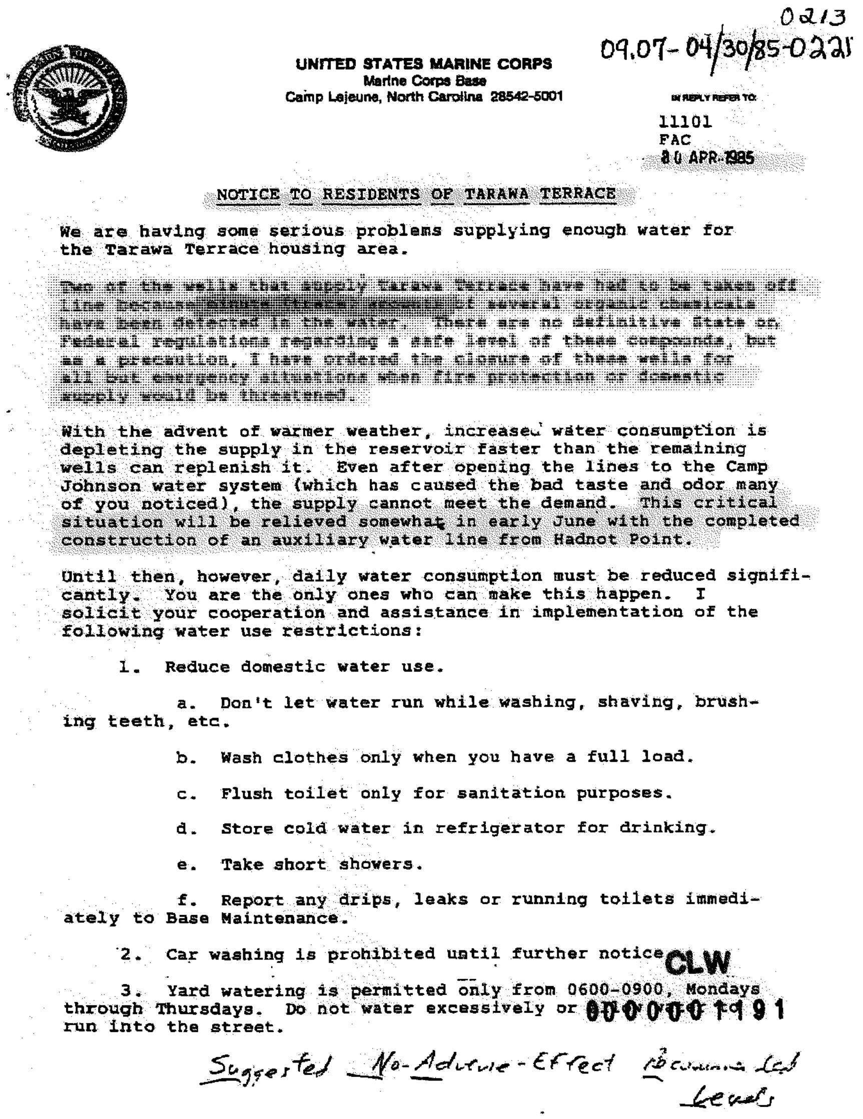
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU
U. U N C L A S S I F I E D U
UUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUUU

REPRODUCED AT GOVERNMENT EXPENSE

ENCLOSURE ([illegible])

POC IS MR. BOB ALEXANDER, MCB ENVIRONMENTAL ENGINEER, AV 484-34/5926.

BT



0213
09.07-04/30/85-0221

UNITED STATES MARINE CORPS
Marine Corps Base
Camp Lejeune, North Carolina 28542-5001

IN REPLY REFER TO:
11101
FAC
30 APR 1985

NOTICE TO RESIDENTS OF TARAWA TERRACE

We are having some serious problems supplying enough water for the Tarawa Terrace housing area.

Two of the wells that supply Tarawa Terrace have had to be taken off line because minute (trace) amounts of several organic chemicals have been detected in the water. There are no definitive State or Federal regulations regarding a safe level of these compounds, but as a precaution, I have ordered the closure of these wells for all but emergency situations when fire protection or domestic supply would be threatened.

With the advent of warmer weather, increased water consumption is depleting the supply in the reservoir faster than the remaining wells can replenish it. Even after opening the lines to the Camp Johnson water system (which has caused the bad taste and odor many of you noticed), the supply cannot meet the demand. This critical situation will be relieved somewhat in early June with the completed construction of an auxiliary water line from Hadnot Point.

Until then, however, daily water consumption must be reduced significantly. You are the only ones who can make this happen. I solicit your cooperation and assistance in implementation of the following water use restrictions:

1. Reduce domestic water use.

   a. Don't let water run while washing, shaving, brushing teeth, etc.

   b. Wash clothes only when you have a full load.

   c. Flush toilet only for sanitation purposes.

   d. Store cold water in refrigerator for drinking.

   e. Take short showers.

   f. Report any drips, leaks or running toilets immediately to Base Maintenance.

2. Car washing is prohibited until further notice.

3. Yard watering is permitted only from 0600-0900, Mondays through Thursdays. Do not water excessively or [illegible] run into the street.

Suggested No-Adverse-Effect Recommended Levels

Subj: NOTICE TO RESIDENTS OF TARAWA TERRACE

Thank you for your understanding in this matter. If these measures are effective in reducing overall water usage, we should be able to open the Tarawa Terrace swimming pool as scheduled. We will keep you informed.

L. H. BUEHL
Major General, U.S. Marine Corps
Commanding General

2 June 2007

My God!!

What a great guy!!

Not only are we contaminating you and your family members in your tap water we're going to let you swim in it as well!!

Jerry E.

To: smtp[dreyerk@hqi.usmc.mil]
From: GS-9 THOMAS S MORRIS@EMD
Cc:
Bcc:
~~Subject: Chronology of events for ABC Cleaners~~
~~Attachment: abc-tt.xls~~
Date: 10/16/98 11:19 AM

Where is this document??

Kelly,

I don't know if the other E-mail went through as I found this address after I had sent the other one. Anyway, attached is the chronology of events for the ABC Cleaners/Tarawa Terrace Wells/ATSDR Public Health Assessment. I generated this in Microsoft Excel 97. I hope this is what you were looking for.
Please let know if you need other information and/or explanation on any of the data presented.

Thanks.
V/R
Tom

HEADQUARTERS, MARINE CORPS BASE, CAMP LEJEUNE

ACTION BRIEF Date: 5 MAR 1985

Staff Section: Assistant Chief of Staff, Facilities

Subj: TARAWA TERRACE (TT) WATER SUPPLY SYSTEM; USE OF CONTAMINATED WELL

Problem: To obtain data on the levels of volatile organic chemicals (VOCs) in finished water at the TT system requires the start-up of the contaminated new well for sample collection with State of North Carolina concurrence.

Background/Discussion:

1. Pending the completion of design and construction of the auxiliary raw water line to TT, using the two contaminated wells will be studied as the CG directed on 1 March 1985. On 4 March 1985, Mr. Mike Bell, N.C. Division of Health Services (NCDHS), Greenville office, which has primacy for the Safe Drinking Water Act, advised Mr. Bob Alexander, MCB Environmental Engineer that, in order to address the above problem, the following operational procedures should be followed:

- Start the new well and allow to operate for 24 hours tributary to the plant.
- Sample the treated water from the TT plant (which is a mixture of the water from the raw well and other wells on-line at the time).
- Close the new well pending receipt of laboratory analyses of the mixture of finished water and review of the analyses.

2. The recommended sampling procedure is:

- Collect one "background" sample of treated water prior to start-up of the new TT well.
- Collect four samples of treated water, sending two each to the NCDHS laboratory and two to the LANTDIV contractor laboratory.

NOTE: Mr. Bell suggested NREAD personnel pre-coordinate with State laboratory personnel prior to sample collection and shipment.

Subj: TARAWA TERRACE WATER SUPPLY SYSTEM; USE OF CONTAMINATED WELL

Recommended Action: CG approve the operational and sampling procedures listed above.

Very respectfully,

M. G. LILLEY
AC/S, Facilities

CS Concur x Nonconcur________
CG Approved________ Disapproved________

3.7.78

Copy to:
MAIN
NREAD
EnvEngr

DEPARTMENT OF HUMAN RESOURCES - DIVISION OF HEALTH SERVICES
LABORATORY SECTION
OCCUPATIONAL HEALTH

G C REPORT SHEET

COMPANY: Camp Lejeune, N.C.

DATE OF ANALYSIS: 3/14/85

PPB
~~TOTAL MICROGRAMS~~

AMPLE #	Chloroform	Dichloro-bromomethane	Dibromo-chloromethane	Trichloro-ethene	Tetrachloro-ethene	Dichloro-ethene	
500975	*	*	*	*	*	*	Plant Before Reservoir Before Turning well ON
500976	*	*	*	*	14.9	*	TT Newwell after Turned on 2
500977	*	*	*	*	40.6	*	TT Newwell after 24 hrs.
500978	*	*	*	*	21.3	*	Plant before Reservoir after 2
500979	*	*	*	*	6.6	*	Plant after Reservoir after 2

*=Less than reporting value (2.0 PPB), or none detected.

To: GS-13 N NEAL PAUL@EMD
From: "GS13 KELLY A DREYER" <dreyerk@hqi.usmc.mil>
Cc:
Bcc:
~~Subject: Public Health Study~~
~~Attachment: ATTRIBS.BND~~
~~Date: 10/13/98 1:32 PM~~

Neal,
I got the information from Tom, thanks - but I need a little more detail.

I had heard that we discovered the contamination related to the ABC cleaners in 1982 and then closed the well(s) in 1985. There are a few liability/funding questions I am trying to troubleshoot with our counsel based on the events surrounding the use and subsequent closure of the wells.

Which wells were contaminated by ABC cleaners? TT- & TT-
Which wells were closed? ALL TT WELLS
When was the contamination discovered?
What were the levels?
How often were the wells sampled?
What were the results?
When were the wells closed?
Why were the wells closed?
Which housing areas did the contaminated wells serve prior to closure?

All wells? In 1985? They were keeping the lie alive. (JME)
timeline

What would be most helpful to me would be a chronology starting with the operation of the dry cleaning facility, installation of the septic field at the cleaners, installation of the water wells in question, discovery of contamination, sampling events, results, closure of the well, any remedial work/health studies conducted, and any other significant event you can think of.

A two column chart would be really helpful - date on the left side and a brief description corresponding to the event on the right. Isn't that right!! (JME)

I am operating on enough information to be dangerous. Since this issue has the potential to blow up imediately, I'd feel much more comfortable having a cheat sheet with the facts - Facts?? Whose facts? (JME)

Thanks for your assistance. I already need to conduct a little damage control - so I'd appreciate it if you would respond at your earliest convenience.

Vr,
Kelly

3 June 2007
All of these internal "timelines" and chronologies will reveal all of the lies and half-truths that were generated by these people in an attempt to cover-up their initial lies. Unfortunately, they (USMC) will not release these documents. (JME)

To: COL BRUCE A GOMBAR@HQTRS,COL RALPH E PEARCY_II@G3A1,COL THOMAS S PHILLIPS@FAC1,[redacted]
From: MAJ SCOTT E JACK@CPAO
Cc:
Bcc:
Subject: ATSDR/Wells TV spot
Attachment:
Date: 2/24/99 7:09 AM

Gentlemen,

Please give me your input, if any, by 1300. I told Dale Ream, Chnl 12, ABC, we would try to do it around 1500 today depending on how the Aviano GCM's are proceeding. Sifting throught the lengthy chronology and preparing these responses was like trying to distill a lake into a perfect raindrop! With TV it is always difficult to summarize. Chop away. v/r, Maj Jack
Questions presented by Dale Ream:

1. When did CLNC find out about the contamination of TCE and PCE in our wells at TT?
A: First our drinking water is safe to drink at CLNC today. The wells you are referring to were closed nearly 15 years ago. During the early 1980's there were many contaminants that were not regulated. Some of these showed up on the water testing at that time. Subsequently, our Facilities and Environmental sections began the process to determine where the source, or sources, of these contaminants orignated. Generally, Camp Lejeune began flushing the wells in 1980's and sampling the water at a number of wells on a daily basis. Here at Tarawa Terrance it was eventually determined that an off base cleaner's solvents were the probable source. Thus, 12 wells were shut down between November 1984 and Feb 1985.

2. What was the process of shutting them down?
A: Generally, the process involves trying to determine where the source of the contaminate is located and stopping it. In some cases, if the level of contaminants were to high the well was immediately closed.

3.When were the wells closed?
A: From November 1984 to February 1985, 12 wells were shut down and in March , 1987 the TT water treatment plant was closed and subsequently demolished.

4. Is the Base cooperating with the ATSDR study?
The Base will cooperate with the study in any way we can.

5. How is the USMC helping in the study?
A: Headquarters Marine Corps is assisting ATSDR in obtaining phone numbers of past residents at TT. Any questions on the details of the study should be addressed to ATSDR.

To: GM-14 FREDERICK E. CONE@FAC1,tsm@emd
From: GS-14 SCOTT A BREWER@EMD1
Originated by: MAJ SCOTT B JACK@CPAO
Cc:
Bcc:
Subject: fwd: re:
Attachment:
Date: 2/24/99 3:25 PM

Fred, Tom:

FYI. Thanks. v/r sab

Original text
From MAJ SCOTT B JACK@CPAO@MCB LEJEUNE, on 2/24/99 2:34 PM:
To: GS-14 SCOTT A BREWER@EMD1@MCB LEJEUNE

Thanks Scott, I willmemorize and do it in 30 minutes. r, Maj Jack

----

From: GS-14 SCOTT A BREWER@EMD1@MCB Lejeune, on 2/24/99 12:47 PM:
Scott:

Fred, Tom, and i made a few changes. Revised responses included below. Most notably: (1) use of "compounds" vs. "contaminates" changed throughout, and (2) if your dialogue is to focus on TT, the number/timeframe of wells closed would be: two (2) in Feb 85; but if the dialogue is the 82/85 timeframe in general, then the number/timeframe of wells closed would be: fourteen (14) and Nov 84-Feb 85. The "other 12" closed wells were not associated with TT. Pls call if questions. V/r sab

1. When did CLNC find out about the contamination of TCE and PCE in our wells at TT?
A: First our drinking water is safe to drink at CLNC today. The wells you are referring to were closed nearly 15 years ago. During the early 1980's there were many compounds that were not regulated. Some of these showed up on the water testing at that time. Subsequently, our Facilities and Environmental sections began the process to determine where the source, or sources, of these compounds originated. Here at Tarawa Terrace two (2) wells were shut down in Feb 1985. It was eventually determined that an off base cleaner's solvents were the probable source. (note: this determination came a couple of years after the 2 TT wells were shut down).

2. What was the process of shutting them down?
A: Generally, the process involves trying to determine where the source of the compound is located and stopping it. This is done through sampling, analysis, and confirmation. If a well is determined to be the source of a compound, the well is closed and no longer used as a water source.

3.When were the wells closed?

A: In February 1985, two (2) wells were shut down and water was supplied to TT from the Holcomb Blvd water plant.

4. Is the Base cooperating with the ATSDR study?
The Base will cooperate with the study in any way we can.

5. How is the USMC helping in the study?
A: Headquarters Marine Corps is assisting ATSDR in obtaining phone numbers of past residents at TT. Any questions on the details of the study should be addressed to ATSDR.
-end-

2 June 2007

These e-mails were generated in response to a local media (3) part story concerning the water contamination on the base. As you can see, the Pub Affairs officer (PAO) Major Scott Jack sent his answers to the reporters questions (which were subm in writing) to other departments at Camp Lejeune. Within (5) hours, Mr. Brewer and Mr. Cone changed th PAO's truthful answer to an out and out lie. Jo Arrington asked me why these people would knowingly have done this? It is my belief, whi is borne out by the facts, that the "lie" was the information they (CWC) had provided to the ATSDR. which is reflected in their PHA. The ATSDR was a this very same time refining the protocol for their Childhood Cancer/Birth defects study at Camp Lejeune. F DoN/USMC entities to minimize the ATSDR's findings at Camp Lejeune, they had to shorten the exposure per they also didn't want the fact that they had returned a "known" "contaminated well to service. The AT started the first phase of their survey in October of 199 During the year of 2000, the USMC began to trickle out the truth by means of their chronology. They never officia

0614

Baker GM13 Carl H

From: Baker GM13 Carl H
Sent: Monday, November 06, 2000 11:06 AM
To: Crouch Capt Alan F
Subject: RE: Housing Statistics

Base Plant Account lists Holcomb Boulevard Plant as completed in August 1973. Service to MP, BM, WV, PP started then and continues today. TT I and TT II were added in 1987

Carl

> -----Original Message-----
> **From:** Crouch Capt Alan F
> **Sent:** Monday, November 06, 2000 10:29 AM
> **To:** Baker GM13 Carl H
> **Subject:** RE: Housing Statistics
>
> Carl,
>
> Thanks for this info. Just so I'm clear, Holcomb came on line in 1972 (month?) and serviced Midway Park, Berkley Manor, Paradise Pt. and Watkins Village until 1987 when TT I and TT II were added. This right?
>
> S/F - Alan
>
>> -----Original Message-----
>> **From:** Baker GM13 Carl H
>> **Sent:** Monday, November 06, 2000 7:47 AM
>> **To:** Crouch Capt Alan F
>> **Subject:** RE: Housing Statistics
>>
>> Holcomb Boulevard provides water to Midway Park, TT I and TT I, Berkeley Manor, Watkins Village and Paradise Point since 1987. From 1972 to 1987, Holcomb Boulevard Plant provided water to the same housing areas except for TT I and TT II.
>>
>> Carl
>>
>> -----Original Message-----
>> **From:** Crouch Capt Alan F
>> **Sent:** Friday, November 03, 2000 7:12 PM
>> **To:** Baker GM13 Carl H
>> **Cc:** Butler Capt Steve A
>> **Subject:** RE: Housing Statistics
>>
>>> Carl,
>>>
>>> Thanks for the info. I also need, please, to add the dates the Hadnot Pt. wells came on line and were taken off line. Also, I know Holcomb Blvd. plant came on line in 1972 -- when and which housing areas did it supply water to vice the Hadnot Pt. plant? When was TT II built? Let me know if this info is readily available. Thanks!
>>>
>>> S/F - Alan
>>>
>>>> -----Original Message-----
>>>> **From:** Baker GM13 Carl H
>>>> **Sent:** Friday, November 03, 2000 3:55 PM

0435

DEPARTMENT OF HEALTH & HUMAN SERVICES
Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

November 30, 1994

copy for
Tom
Walt
Brad

Brigadier General Livingston
Commanding General
Marine Corps Base
PSC Box 20004
Camp LeJeune, North Carolina 28542

Dear General Livingston:

I am writing on behalf of the Agency for Toxic Substances and Disease Registry (ATSDR) to request your assistance in obtaining information necessary to conduct a health study at the US Marine Corps Base at Camp LeJeune. This study will investigate the potential relationship between exposure to trichloroethylene and tetrachloroethylene that has been found in the drinking water at MCB Camp LeJeune and adverse pregnancy outcomes. This study was recommended in ATSDR's health assessment for MCB Camp LeJeune, and our plans to conduct this study have been submitted to the Department of Defense. In addition, our protocol has undergone both internal and external peer reviews, and has received human subjects clearance.

In order to conduct this study, we must review housing occupancy records as well as a small sample of hospital records from babies born at the Navy Regional Medical Center for the years 1968-1985. Mr. Neal Paul suggested that we visit MCB Camp LeJeune to brief points of contact on base who might be involved in the health study. Ms. Nancy Sonnenfeld, the principal investigator for this health study and other ATSDR staff are planning a trip to the base sometime in mid or late December. We hope that this will facilitate a smooth transition from the health assessment activities that ATSDR has conducted at MCB Camp LeJeune to the health study activities that we are just starting.

I am requesting a point of contact within the base family housing office and another point of contact within the hospital or Office of Health and Safety who have the authority to provide ATSDR and its research team with access to these records. We understand that confidentiality may be of concern in regards to this record review. As in any research study conducted by ATSDR, our research team is bound to maintain confidentiality of all records under the Privacy Act of 1974.

CLW

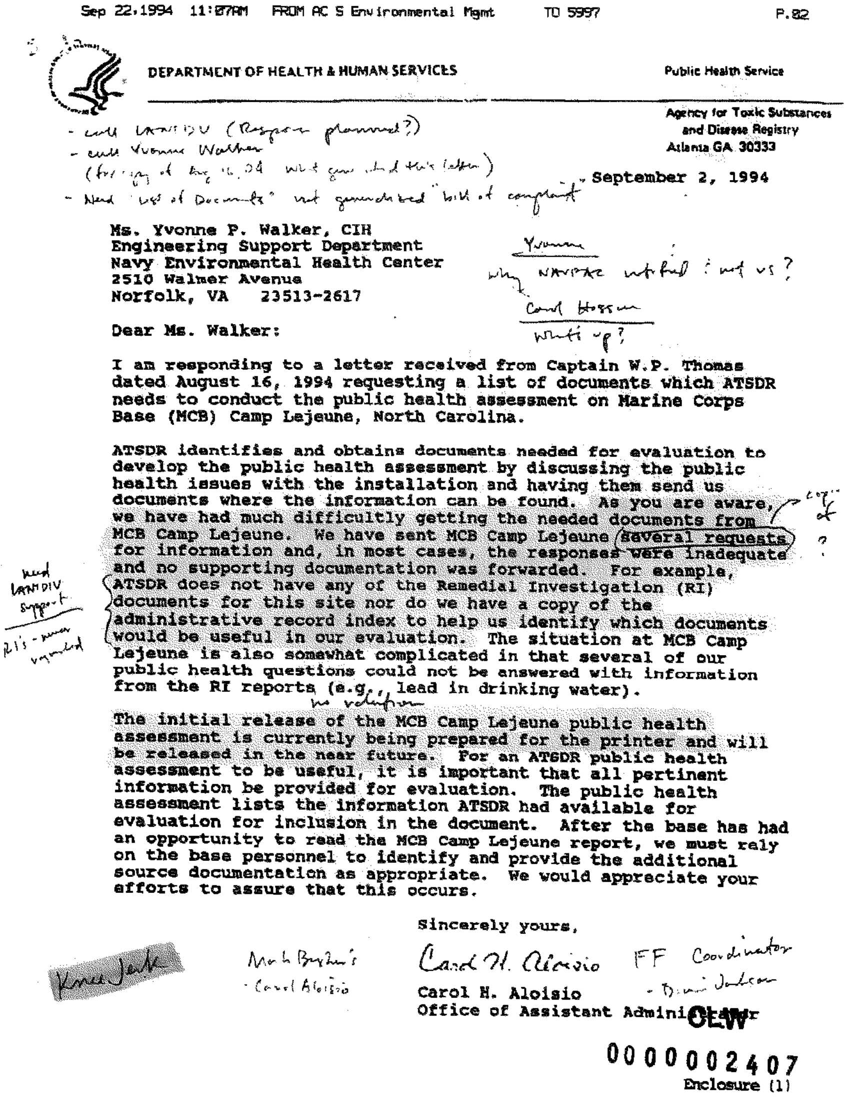
We look forward to hearing from you soon, so that we may begin work by the first of next year. If you should have any questions about this request, please feel free to contact Ms. Sonnenfeld or me at (404) 639-6203.

Sincerely yours,

Wendy E Kaye, PhD

Wendy E. Kaye, Ph.D.
Chief, Epidemiology
and Surveillance Branch
Division of Health Studies

cc:
Ms. Susan Board, ATSDR
Ms. Diane Jackson, ATSDR
Ms. Carole Hossom, ATSDR
Mr. Robert Warren, MCB Camp LeJeune
Mr. Neal Paul, MCB Camp LeJeune
Mr. Lin Brinn, MCB Camp LeJeune
Mr. George Reynoulds, MCB Camp LeJeune
Captain W. Thomas, NEHC
Ms. Yvonne Walker, NEHC



Sep 22,1994 11:07AM FROM AC S Environmental Mgmt TO 5997 P.02

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

- call LANTDIV (Response planned?)
- call Yvonne Walker
(for copy of Aug 16, 94 which generated this letter)
- Need "list of Documents" not generalized "bill of complaint"

September 2, 1994

Ms. Yvonne P. Walker, CIH
Engineering Support Department
Navy Environmental Health Center
2510 Walmer Avenue
Norfolk, VA 23513-2617

Yvonne
why NAVFAC notified & not us?
Carol Hossum
What's up?

Dear Ms. Walker:

I am responding to a letter received from Captain W.P. Thomas dated August 16, 1994 requesting a list of documents which ATSDR needs to conduct the public health assessment on Marine Corps Base (MCB) Camp Lejeune, North Carolina.

ATSDR identifies and obtains documents needed for evaluation to develop the public health assessment by discussing the public health issues with the installation and having them send us documents where the information can be found. As you are aware, we have had much difficultly getting the needed documents from MCB Camp Lejeune. We have sent MCB Camp Lejeune several requests for information and, in most cases, the responses were inadequate and no supporting documentation was forwarded. For example, ATSDR does not have any of the Remedial Investigation (RI) documents for this site nor do we have a copy of the administrative record index to help us identify which documents would be useful in our evaluation. The situation at MCB Camp Lejeune is also somewhat complicated in that several of our public health questions could not be answered with information from the RI reports (e.g., lead in drinking water).

copy of ?

need LANTDIV support
RI's - never requested

no validation

The initial release of the MCB Camp Lejeune public health assessment is currently being prepared for the printer and will be released in the near future. For an ATSDR public health assessment to be useful, it is important that all pertinent information be provided for evaluation. The public health assessment lists the information ATSDR had available for evaluation for inclusion in the document. After the base has had an opportunity to read the MCB Camp Lejeune report, we must rely on the base personnel to identify and provide the additional source documentation as appropriate. We would appreciate your efforts to assure that this occurs.

Sincerely yours,

Carol H. Aloisio

FF Coordinator
- Dennis Jackson

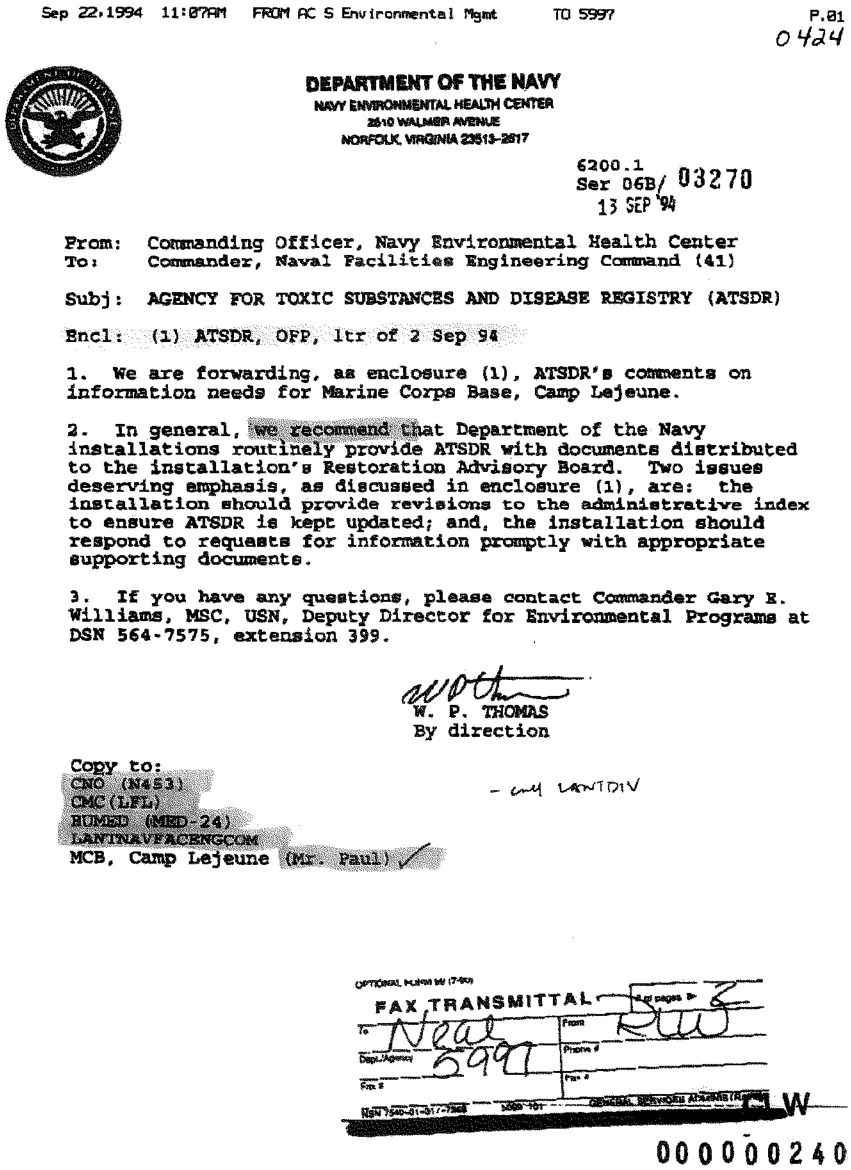
Carol H. Aloisio
Office of Assistant Administrator

OLW

Knee Jerk

Mark Bergstein's
- Carol Aloisio

0000002407
Enclosure (1)



Sep 22,1994 11:07AM FROM AC S Environmental Mgmt TO 5997 P.01

0424

DEPARTMENT OF THE NAVY
NAVY ENVIRONMENTAL HEALTH CENTER
2510 WALMER AVENUE
NORFOLK, VIRGINIA 23513-2617

6200.1
Ser 06B/ 03270
13 SEP '94

From: Commanding Officer, Navy Environmental Health Center
To: Commander, Naval Facilities Engineering Command (41)

Subj: AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY (ATSDR)

Encl: (1) ATSDR, OFP, ltr of 2 Sep 94

1. We are forwarding, as enclosure (1), ATSDR's comments on information needs for Marine Corps Base, Camp Lejeune.

2. In general, we recommend that Department of the Navy installations routinely provide ATSDR with documents distributed to the installation's Restoration Advisory Board. Two issues deserving emphasis, as discussed in enclosure (1), are: the installation should provide revisions to the administrative index to ensure ATSDR is kept updated; and, the installation should respond to requests for information promptly with appropriate supporting documents.

3. If you have any questions, please contact Commander Gary E. Williams, MSC, USN, Deputy Director for Environmental Programs at DSN 564-7575, extension 399.

W. P. THOMAS
By direction

Copy to:
CNO (N453)
CMC (LFL)
BUMED (MED-24)
LANTNAVFACENGCOM
MCB, Camp Lejeune (Mr. Paul) ✓

- only LANTDIV

OPTIONAL FORM 99 (7-90)
FAX TRANSMITTAL # of pages ▸ 3

To Neal	From RW
Dept./Agency 5997	Phone #
Fax #	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

CLW

0399

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

March 5, 1993

Mr. Neal Paul
Installation Restoration Program
Environmental Management Department
Building 1, MCB Camp Lejeune
Camp Lejeune, North Carolina 28542-5001

Dear Mr. Paul:

The Agency for Toxic Substances and Disease Registry (ATSDR) visited Marine Corps Base Camp Lejeune (MCBCL) on October 26-30, 1992. The purpose of the site visit was to gather information for a public health assessment of facilities at the MCBCL which are listed on the Environmental Protection Agency's (EPA) National Priorities List. An ATSDR public health assessment evaluates data and information on the release of hazardous substances from MCBCL into the environment and assesses if there is any past, current, or future impact on public health. The environmental data used in public health assessments are provided by the Department of Defense (DOD) component involved; EPA, state, and local environmental and health agencies; and other groups or individuals.

Under the provisions of the Memorandum of Understanding between ATSDR and DOD, ATSDR is to be furnished with copies of site related materials appropriate for the preparation of public health assessments. ATSDR has reviewed the administrative record and requests the following:

1. A list of removals, interim remedial actions, and any mitigation efforts.
2. A list of Technical Review Committee (TRC) members (including names, addresses, and phone numbers).
3. Copies of updated Site Investigation reports, Work Plans, interim reports, Final Remedial Investigation/Feasibility Study (RI/FS) documents, and proposed Records of Decision (ROD) for the sites under investigation at MCBCL. Final Reports Only ~~for ROD~~ → send 2 or 3 Final RI/FS

In addition, please add ATSDR to your administrative record mailing list. Your cooperation is greatly appreciated.

Documents should be mailed to:

Chief, Records and Information Management Branch
Attention: Stephen S. Aoyama
ATSDR, Mailstop E-56
1600 Clifton Road
Atlanta, Georgia 30333

If you have any questions, please contact me at (404)639-6002.

Sincerely yours,

Steph S Aoyama

Stephen S. Aoyama, P.E.
Environmental Engineer

cc:
Mr. Byron Brant, LANTDIV

VOC contamination of GW
- when

cc mr Thomas Morris 0398

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Agency for Toxic Substances
and Disease Registry
Atlanta GA 30333

February 23, 1993

Mr. Neal Paul
IRD/EMD
Building 1
USMC Naval Base
Camp LeJeune, North Carolina 28542

Where are The enclosures To This LeTTer ???
missing

Dear Mr. Paul:

I recently spoke with Mr. Thomas Morris of your staff about obtaining more detailed information about the potential contamination of drinking water data at Marine Corps Base Camp Lejeune (MCBCL). Mr. Morris indicated that I should make my requests in writing to you.

The Agency for Toxic Substances and Disease Registry (ATSDR) is mandated to assess any potential health risks associated with exposure to hazardous substances at Superfund sites such as MCBCL. In particular, we are interested in characterizing any residential exposure to contaminants in drinking water at MCBCL prior to the closure of contaminated wells at Hadnot Point, Tarawa Terrace and Rifle Range Areas.

As the Navy has noted, the discovery of contamination in potable wells at these sites does not in itself imply that anyone actually drank or washed with contaminated water; the water was treated and diluted before distribution. Therefore, I would like to examine the data from samples of the tap water which was actually distributed to individual residences and housing areas on the base. In particular, I would like to know: what treatment processes raw water undergoes before it reaches the tap in each of the seven water systems at LeJeune; when tapwater was first analyzed for contaminants at MCBCL; the dates when contamination was first discovered in raw water potable wells and in tapwater; the date that each contaminated potable well was closed; the frequency of tapwater sampling prior to and after closure of contaminated potable wells; the number of samples analyzed at the time of each sampling; the types of compounds analyzed; and the results of each analysis (i.e. the concentration of all contaminants detected).

What ??

In addition, I am trying to assess how many people consume water from which wells, and for how long. I would like a list of all housing areas on the base, the location of these housing areas, the number of people in each housing area, and the source of water for that area. Pump schedules of each of the seven water distributions systems and any information on the number of MCBCL and off-site residences or commercial establishments whose water is supplied by private wells, the location of wells, and any tap sampling conducted on water from private wells would be most useful. Finally, I would like a rough estimate of the number of people who had lived at LeJeune for longer than five years and the number of people who had lived at LeJeune for longer than 10 years at the time that the contaminated wells were closed.

For your information, I have enclosed the only set of pre-1985 drinking water data currently available to me. As you will note from the enclosure, the detection limits listed for several organic compounds are theoretically impossible, and that the correct units are most likely ppm, not ppb. If you have any information on these results I would appreciate your sending them as well.

Thank you very much for your cooperation in this matter. I look forward to hearing from you or Mr. Morris.

Sincerely yours,

Nancy Lynn Sonnenfeld

Nancy L. Sonnenfeld, M.S.P.H.
Epidemiologist, Epidemiology
and Surveillance Branch
Division of Health Studies

Enclosures

Navy Sample 651 received 1-18-85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL432 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0414 #651

METHOD NO. 624 DETECTION LIMIT 10 ug/lit

ANALYSIS DATE 2-2-85

PARAMETER	RESULT ug/lit
2V acrolein	N.D.
3V acrylonitrile	N.D.
4V benzene	N.D.
6V carbon tetrachloride	N.D.
7V chlorobenzene	N.D.
10V 1,2-dichloroethane	N.D.
11V 1,1,1-trichloroethane	N.D.
13V 1,1-dichloroethane	N.D.
14V 1,1,2-trichloroethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.
16V chloroethane	N.D.
19V 2-chloroethylvinyl ether	N.D.
23V chloroform	N.D.
29V 1,1-dichloroethylene	187 ~~N.D.~~
30V 1,2-trans-dichloroethylene	3400 ~~N.D.~~

PARAMETER	RESULT ug/lit
32V 1,2-dichloropropane	N.D.
33V 1,3-dichloropropylene	N.D.
38V ethylbenzene	N.D.
44V methylene chloride	N.D.
45V methyl chloride	N.D.
46V methyl bromide	N.D.
47V bromoform	N.D.
48V dichlorobromomethane	N.D.
49V trichlorofluoromethane	N.D.
50V dichlorodifluoromethane	N.D.
51V chlorodibromomethane	N.D.
85V tetrachloroethylene	386 ~~N.D.~~
86V toluene	N.D.
87V trichloroethylene	3200 ~~N.D.~~
88V vinyl chloride	655 ~~N.D.~~

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

'avy sample #651 ''ceived 2-7-85

CLW 0000005[illegible]

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOA SPL 497 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-050Z #651 1410 250 ul → 5000 1:20 Dilution

METHOD NO. 624 DETECTION LIMIT 200 ug/lit

ANALYSIS DATE 2/8/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	397 ~~N.D.~~
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	17600 ~~N.D.~~
30V 1,2-trans-dichloroethylene	~~N.D.~~ 8070	88V vinyl chloride	* 179 ~~N.D.~~

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* Below Method Detection Limit

T y sample #651 recd 2-7-85

JTC ENVIRONMENTAL CONSULTANTS, INC.
PRIORITY POLLUTANT ANALYSIS DATA SHEET

CLW
00000[illegible]2

VOLATILE FRACTION

LAB SAMPLE LOG NO. VOASPL 496 PROJECT NO. NF-12

SAMPLE DESIGNATION & DATE 12-0501 #651 1410 1:20 Dilution

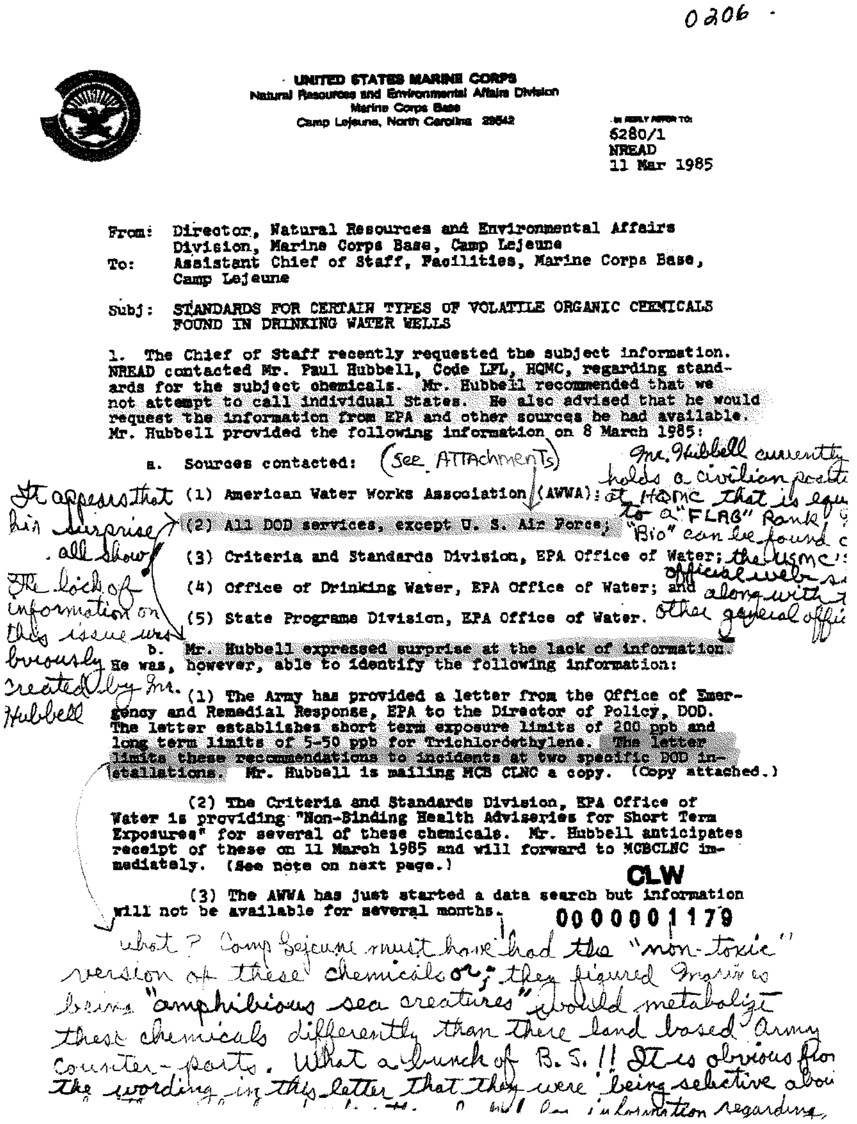
METHOD NO. 624 DETECTION LIMIT 200 ug/lit

ANALYSIS DATE 2/8/85

PARAMETER	RESULT ug/lit	PARAMETER	RESULT ug/lit
2V acrolein	N.D.	32V 1,2-dichloropropane	N.D.
3V acrylonitrile	N.D.	33V 1,3-dichloropropylene	N.D.
4V benzene	N.D.	38V ethylbenzene	N.D.
6V carbon tetrachloride	N.D.	44V methylene chloride	N.D.
7V chlorobenzene	N.D.	45V methyl chloride	N.D.
10V 1,2-dichloroethane	N.D.	46V methyl bromide	N.D.
11V 1,1,1-trichloroethane	N.D.	47V bromoform	N.D.
13V 1,1-dichloroethane	N.D.	48V dichlorobromomethane	N.D.
14V 1,1,2-trichloroethane	N.D.	49V trichlorofluoromethane	N.D.
15V 1,1,2,2-tetrachloroethane	N.D.	50V dichlorodifluoromethane	N.D.
16V chloroethane	N.D.	51V chlorodibromomethane	N.D.
19V 2-chloroethylvinyl ether	N.D.	85V tetrachloroethylene	400 ~~N.D.~~
23V chloroform	N.D.	86V toluene	N.D.
29V 1,1-dichloroethylene	N.D.	87V trichloroethylene	18,900 ~~N.D.~~
30V 1,2-trans-dichloroethylene	7580 ~~N.D.~~	88V vinyl chloride	168* ~~N.D.~~

N.D. = NOT DETECTED
N.A. = NOT APPLICABLE/ANALYZED

* Below Method Detection Limit



0206 ·

UNITED STATES MARINE CORPS
Natural Resources and Environmental Affairs Division
Marine Corps Base
Camp Lejeune, North Carolina 28542

IN REPLY REFER TO:
6280/1
NREAD
11 Mar 1985

From: Director, Natural Resources and Environmental Affairs Division, Marine Corps Base, Camp Lejeune
To: Assistant Chief of Staff, Facilities, Marine Corps Base, Camp Lejeune

Subj: STANDARDS FOR CERTAIN TYPES OF VOLATILE ORGANIC CHEMICALS FOUND IN DRINKING WATER WELLS

1. The Chief of Staff recently requested the subject information. NREAD contacted Mr. Paul Hubbell, Code LFL, HQMC, regarding standards for the subject chemicals. Mr. Hubbell recommended that we not attempt to call individual States. He also advised that he would request the information from EPA and other sources he had available. Mr. Hubbell provided the following information on 8 March 1985:

a. Sources contacted: (See ATTACHMENTS)

(1) American Water Works Association (AWWA);

(2) All DOD services, except U. S. Air Force;

(3) Criteria and Standards Division, EPA Office of Water;

(4) Office of Drinking Water, EPA Office of Water; and

(5) State Programs Division, EPA Office of Water.

Mr. Hubbell currently holds a civilian positi at HQMC that is equ to a "FLAG" Rank; "Bio" can be found o the USMC's official web s along with other general offi

It appears that his surprise . all show The lack of information on this issue was bviously created by Mr. Hubbell

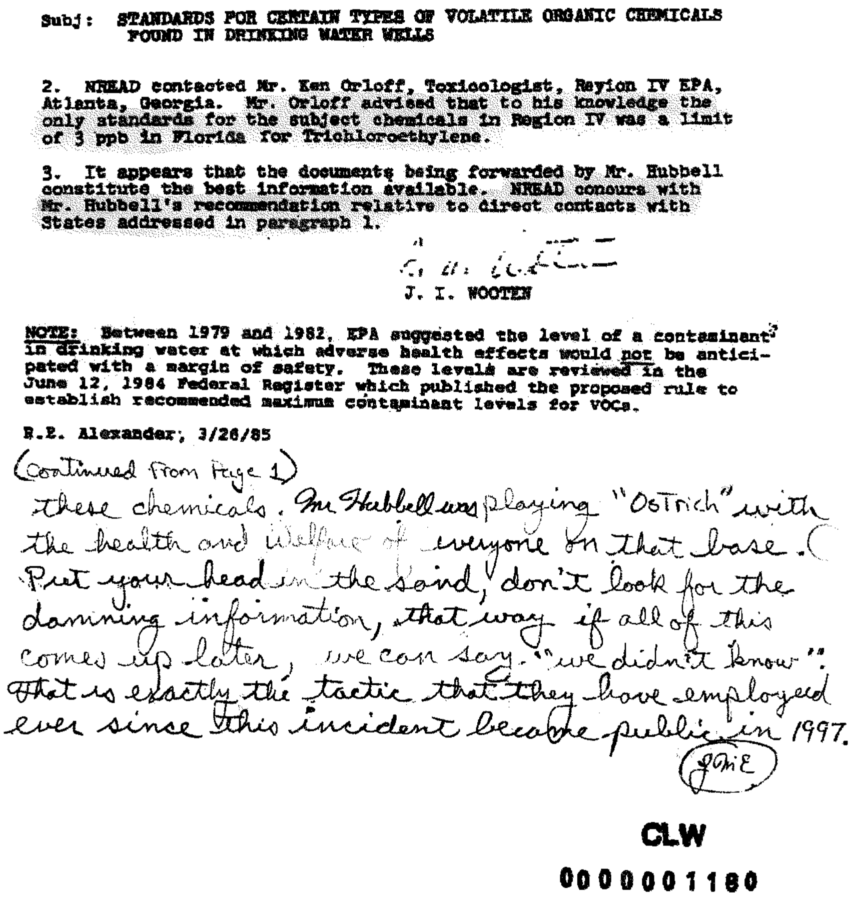
b. Mr. Hubbell expressed surprise at the lack of information. He was, however, able to identify the following information:

(1) The Army has provided a letter from the Office of Emergency and Remedial Response, EPA to the Director of Policy, DOD. The letter establishes short term exposure limits of 200 ppb and long term limits of 5-50 ppb for Trichlorœthylene. The letter limits these recommendations to incidents at two specific DOD installations. Mr. Hubbell is mailing MCB CLNC a copy. (Copy attached.)

(2) The Criteria and Standards Division, EPA Office of Water is providing "Non-Binding Health Adviseries for Short Term Exposures" for several of these chemicals. Mr. Hubbell anticipates receipt of these on 11 March 1985 and will forward to MCBCLNC immediately. (See note on next page.)

(3) The AWWA has just started a data search but information will not be available for several months.

what? Camp Lejeune must have had the "non-toxic" version of these chemicals or; they figured Marines being "amphibious sea creatures" would metabolize these chemicals differently than there land based Army counter-parts. What a bunch of B.S.!! It is obvious from the wording in this letter that they were being selective abou [illegible] information regarding



Subj: STANDARDS FOR CERTAIN TYPES OF VOLATILE ORGANIC CHEMICALS FOUND IN DRINKING WATER WELLS

2. NREAD contacted Mr. Ken Orloff, Toxicologist, Reyion IV EPA, Atlanta, Georgia. Mr. Orloff advised that to his knowledge the only standards for the subject chemicals in Region IV was a limit of 3 ppb in Florida for Trichloroethylene.

3. It appears that the documents being forwarded by Mr. Hubbell constitute the best information available. NREAD concurs with Mr. Hubbell's recommendation relative to direct contacts with States addressed in paragraph 1.

J. I. WOOTEN

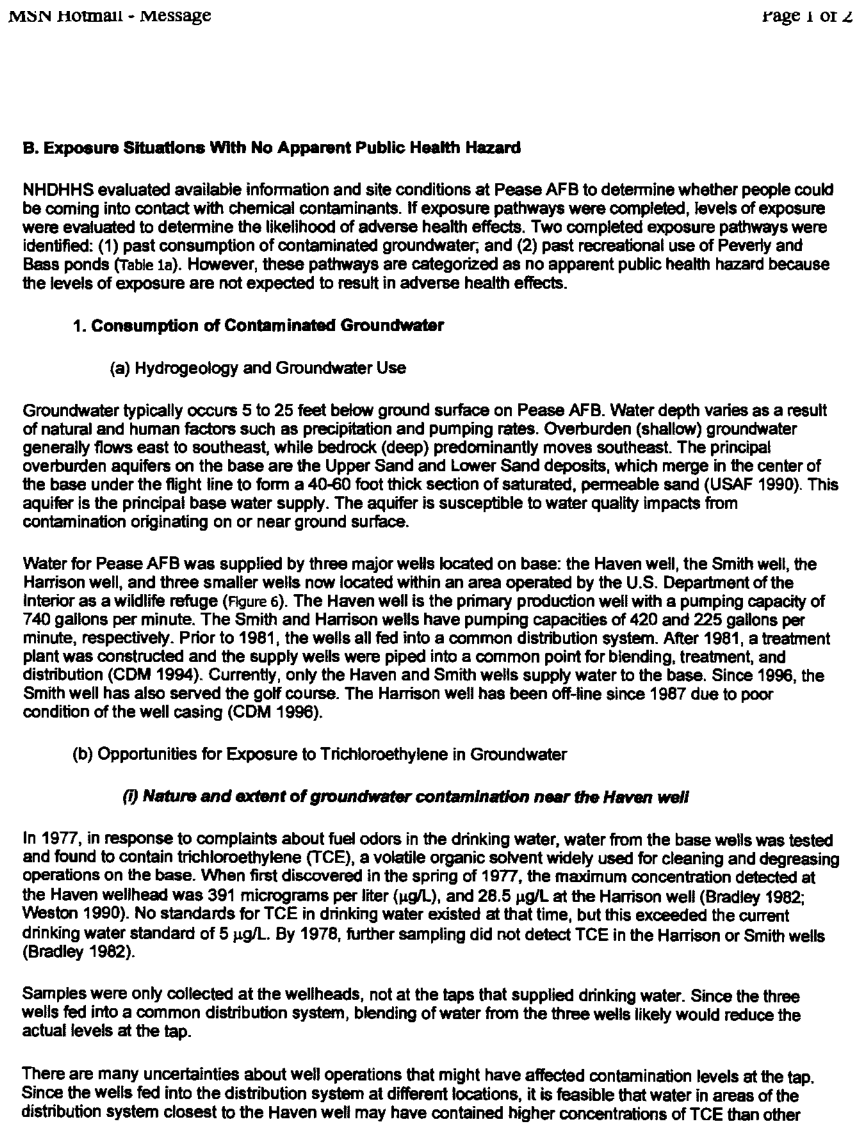
NOTE: Between 1979 and 1982, EPA suggested the level of a contaminant in drinking water at which adverse health effects would not be anticipated with a margin of safety. These levels are reviewed in the June 12, 1984 Federal Register which published the proposed rule to establish recommended maximum contaminant levels for VOCs.

R.E. Alexander, 3/26/85

(continued from Page 1)

these chemicals. Mr Hubbell was playing "Ostrich" with the health and welfare of everyone on that base. (Put your head in the sand, don't look for the damning information, that way if all of this comes up later, we can say. "we didn't know". That is exactly the tactic that they have employed ever since this incident became public in 1997.

(JME)



B. Exposure Situations With No Apparent Public Health Hazard

NHDHHS evaluated available information and site conditions at Pease AFB to determine whether people could be coming into contact with chemical contaminants. If exposure pathways were completed, levels of exposure were evaluated to determine the likelihood of adverse health effects. Two completed exposure pathways were identified: (1) past consumption of contaminated groundwater; and (2) past recreational use of Peverly and Bass ponds (Table 1a). However, these pathways are categorized as no apparent public health hazard because the levels of exposure are not expected to result in adverse health effects.

1. Consumption of Contaminated Groundwater

(a) Hydrogeology and Groundwater Use

Groundwater typically occurs 5 to 25 feet below ground surface on Pease AFB. Water depth varies as a result of natural and human factors such as precipitation and pumping rates. Overburden (shallow) groundwater generally flows east to southeast, while bedrock (deep) predominantly moves southeast. The principal overburden aquifers on the base are the Upper Sand and Lower Sand deposits, which merge in the center of the base under the flight line to form a 40-60 foot thick section of saturated, permeable sand (USAF 1990). This aquifer is the principal base water supply. The aquifer is susceptible to water quality impacts from contamination originating on or near ground surface.

Water for Pease AFB was supplied by three major wells located on base: the Haven well, the Smith well, the Harrison well, and three smaller wells now located within an area operated by the U.S. Department of the Interior as a wildlife refuge (Figure 6). The Haven well is the primary production well with a pumping capacity of 740 gallons per minute. The Smith and Harrison wells have pumping capacities of 420 and 225 gallons per minute, respectively. Prior to 1981, the wells all fed into a common distribution system. After 1981, a treatment plant was constructed and the supply wells were piped into a common point for blending, treatment, and distribution (CDM 1994). Currently, only the Haven and Smith wells supply water to the base. Since 1996, the Smith well has also served the golf course. The Harrison well has been off-line since 1987 due to poor condition of the well casing (CDM 1996).

(b) Opportunities for Exposure to Trichloroethylene in Groundwater

(i) Nature and extent of groundwater contamination near the Haven well

In 1977, in response to complaints about fuel odors in the drinking water, water from the base wells was tested and found to contain trichloroethylene (TCE), a volatile organic solvent widely used for cleaning and degreasing operations on the base. When first discovered in the spring of 1977, the maximum concentration detected at the Haven wellhead was 391 micrograms per liter (µg/L), and 28.5 µg/L at the Harrison well (Bradley 1982; Weston 1990). No standards for TCE in drinking water existed at that time, but this exceeded the current drinking water standard of 5 µg/L. By 1978, further sampling did not detect TCE in the Harrison or Smith wells (Bradley 1982).

Samples were only collected at the wellheads, not at the taps that supplied drinking water. Since the three wells fed into a common distribution system, blending of water from the three wells likely would reduce the actual levels at the tap.

There are many uncertainties about well operations that might have affected contamination levels at the tap. Since the wells fed into the distribution system at different locations, it is feasible that water in areas of the distribution system closest to the Haven well may have contained higher concentrations of TCE than other areas of the system closer to the Smith and Harrison wells. Another area of uncertainty is the operational schedules for individual wells. Past pumping schedules are unknown, and it is not clear whether the wells pumped in combination or were cycled one at a time. In the absence of more information about the well operational schedules, it is assumed that the wells were all on line and pumping into the distribution system simultaneously.

According to the water supply engineer for the City of Portsmouth, following discovery of the contamination, the wells were shut off and clean water was supplied to the base by the City of Portsmouth during the period of 1977-1978 (Craven 1998). During that time, the U.S. Geological Survey (USGS) investigated the contamination and identified a likely source to the north of the well (Bradley 1982).

During the investigation, the Haven well was heavily pumped, thus reducing the contaminant levels as clean groundwater entered the Haven well area. In Fall 1978, the wells went back on line. At the time, the Surgeon General established a TCE concentration limit of 280 µg/L in drinking water (USAF 1990). The concentrations of TCE in the Haven well had dropped below this level, but there was still concern regarding the safety of the drinking water. In 1981, the Air Force agreed to construct a water treatment plant. The treatment plant was finished in 1984 but never went on-line due to operational problems. Since January 1986, Haven well water samples indicate that TCE levels remain consistently below the current drinking water standard of 5 µg/L (Weston 1990).

The Air Force later determined that the likely source of TCE contamination was a leaking storm sewer line that passed in the vicinity

NORTH CAROLINA DEPARTMENT OF HUMAN RESOURCES
DIVISION OF HEALTH SERVICES
OCCUPATIONAL HEALTH LABORATORY

Tom Morris: May 10, 1993

1. Where are these sites located?
2. What wells are the sources of water?
   - a. Are those wells the source of VOCs?
   - b. If not, do you know the VOC source?
3. If wells are the source of VOC, are the wells closed?
4. Has the source of VOC been identified and removed?

Thanks,
Stephen S. Aoyama, (404)639-6070

COMPANY:Camp Lejeune Water System
ADDRESS:Camp Lejeune, Jacksonville, N
SERVICE REQUESTED:VOLATILE ORGANIC A
SAMPLE TAKEN ON:1/31/85
SAMPLE TAKEN BY:Betsy Betz
SUBMITTED TO LABORATORY:2/1/85
SUBMITTED BY:Betsy Betz

DATE OF ANALYSIS:2/1-4/85
ANALYSED BY:John L. Neal

DATE REPORTED:2/4/85

RESULTS IN PPB (ug/liter)

Bldg. 21 close by had UST leak.

LOCATION	DICHLOROETHYLENE	TRICHLOROETHYLENE
Bldg 20	321.3	900.0 STP HPIA
Bldg 670 Bottom	7.4	24.1
MOQ 2212 Cold Water	249.4	724.6
Bldg 670 Top	7.6	26.8
MOQ 2212 Hot Water	201.2	612.9
Bldg 670 Middle	7.8	25.8
Tank SLCH 4004	107.5	318.3
Hydrant MOQ 2204	307.6	839.7
Hydrant Elev. Tank S-830	340.0	849.0
Tank S-2323	159.0	407.1
BM 5677	368.7	981.3
BM 5531	335.0	905.5
Bldg PP 2600	332.4	890.9
Bldg 5400 (Berkeley Manor School Cafeteria)	406.6	1,148.4

COMMENTS:

Also identified in all samples were chloroform, dichloromethane, and two (2) unidentified peaks possibly dibromomethane and bromoform. Total Trihalomethanes <<100.0 PPB.

REPORTED BY: John L. Neal

cc. Charles Rundgren, Water Supply Branch
Mike Bell, EEO
✓Fred Hill, EEO
Environmental Epidemiology

Doc.No.: CLCJ-00247-1.02-10/25/85

RECEIVED
OCT 28 1985
WILMINGTON REGIONAL OFFICE
DEM

State of North Carolina
Department of Natural Resources and Community Development
Division of Environmental Management
512 North Salisbury Street • Raleigh, North Carolina 27611

James G. Martin, Governor
S. Thomas Rhodes, Secretary

R. Paul Wilms
Director

October 25, 1985

more complete report in
Water Sampling [illegible]

Mr. Larry Fitzpatrick
141 Brookview Court
Jacksonville, N.C. 28540

Dear Mr. Fitzpatrick:

The attached report on groundwater pollution at Camp Lejeune was prepared by Rick Shiver of our Wilmington Regional Office. I hope it will be helpful to you.

You may note that our recommendations regarding future investigations or corrective action are "requested" when normally they would be "required". This is because there is some question as to the extent of our authority to correct groundwater pollution on federal installations under the Water and Air Resources Act (GS 143). The Oil Pollution and Hazardous Substances Control Act seems clearly to exclude discharges due to negligence on federal property from our jurisdiction.

We are now in the process of requesting the Attorney General to address these questions and provide us with their opinion of our legal authority on these properties.

Central office groundwater staff are in agreement with Rick's conclusions and recommendations and are taking immediate steps to implement them.

Should you wish to be kept informed periodically on progress at Camp Lejeune, please give me a call at (919) 733-5083.

Sincerely,

Perry Nelson

Perry F. Nelson, Chief
Groundwater Section

PFN/tfa

Attachment:

cc: Paul Wilms
Chuck Wakild Regional Supervisor, Wilmington

Pollution Prevention Pays

P.O. Box 27687, Raleigh, North Carolina 27611-7687 Telephone 919-733-7015

An Equal Opportunity Affirmative Action Employer

DOC. No.: CLEJ-00247-1.02-10/05/85

Background

The framework whereby the Marine Corps can remediate groundwater pollution at problem sites is the NACIP program. This acronym stands for "Naval Assessment and Control of Institutional Pollutants". Begun in September 1980, the NACIP program is the Navy's "superfund" program (federal installations are exempt from CERCLA coverage).

The NACIP program, broadly defined, mandates the identification, study, and correction of pollution problems caused by past disposal practices of hazardous materials. Specifically, it consists of three phases: 1) the first phase requires the identification and prioritization of problem sites at the base (initial assessment study), 2) the second phase (confirmation study) authorizes technical studies at the priority sites to define the severity of the contamination problem, and 3) the third phase specifies remedial actions (corrective measures) at documented problem sites. Appendix I provides a detailed explanation of the NACIP program in progress at the MCB.

DOC. No.: CLJ-00247-1.02-10/25/85

Chronology of Events

The initial assessment study was performed at the MCB from February 1982 to February 1983. Conducted by consultants with Water and Air Research, Inc., the study emphasized groundwater contamination sites. The findings and recommendations were incorporated into an April 1983 document titled Initial Assessment Study of Marine Corps Base Camp Lejeune North Carolina. Although seventy-three (73) contamination sites were identified at the MCB, the investigators concluded that further studies could be justified only at twenty-two (22) priority sites. Figure 1 shows the location of these 73 sites, and Appendix II provides an executive summary of the report.

Have Copy this volume

During July 1984, confirmation studies were begun at eighteen (18) priority sites. The results of these groundwater studies were documented in a report provided to the Marine Corps in February 1985; as the Marine Corps disagrees with the conclusions in this report, it will not release a copy of it to any outside agency. Recently, however, the Marine Corps did agree to provide DEM copies of the technical data for review and interpretation.

Div. of Environmental Management. FOIA

As part of this confirmation study, it was recommended that volatile organic analyses (VOA) samples be collected from any community water supply well that is located proximal to a priority site. In July 1984, solvents and gasoline were discovered present in well HP-602, and expanded quality studies eventually verified the presence of organic contaminants in ten (10) wells. The organic contaminants included: tetrachloroethylene, trichloroethylene, dichloroethylene, methylene chloride, 1,1 - dichloroethane, benzene, toluene, and dichlorobenzene. Although no safe drinking water

DOC. NO.: CLEJ-00247-1.02-10/25/85

standards have been established for these constituents, the Marine Corps nevertheless discontinued use of the contaminated wells during December 1984.

Believing that the ten contaminated wells obviated violations of 15 NCAC 2L regulations, DEM issued the MCB a notice of violation (NOV) to that effect on May 15, 1985. This NOV (see Appendix III) required the Marine Corps to submit to DEM a plan of action (with a schedule of compliance) that would: 1) identify the source(s) of contamination, 2) define the geometry of the plumes, 3) define the quality attributes of the plume(s), 4) project the future impacts of the source(s), and 5) propose remedial actions to restore the polluted groundwaters to GA standards. The Marine Corps response to this NOV was simply to expedite the implementation of the NACIP program: a copy of the 19 July 1985 HAVE response is Appendix IV.

Contamination of two of the ten wells on the MCB is related to civilian sources. The organic solvents present in the two wells at Tarawa Terrace I probably originate from nearby dry cleaner(s). During April 1985, DEM initiated a study to identify the source(s) of this plume(s), and while the field study is completed, the analytical studies are not, so no conclusions are yet possible.

DOC. NO.: CLEJ-00247-1.02-10/25/85

Conclusions and Recommendations

The principal conclusions are as follows:

1. There are thirty-eight (38) known pollution sites that are of concern to DEM;
2. The NACIP program is designed to remedy problems only at serious hazardous waste sites;
3. Eight (perhaps nine) community supply wells have been contaminated by on-base sources;
4. Two community supply wells have been contaminated by off-base sources;
5. Another eighteen community water supply wells are in jeopardy of being contaminated by on-base sources.
6. In part because of the contamination problem, the Marine Corps occasionally experiences problems in meeting peak water demand at the MCB.

Given the actual and potential severity of the quality problems at the MCB, the following recommendations are offered for consideration:

1. Require the Marine Corps to initiate confirmatory studies at sixteen sites that are not NACIP priority sites, but are sites of concern to DEM;
2. At priority sites 2, 6, 9, 21, 22, 54, 68, 69, 74 and 76, where confirmatory studies have been performed, require the Marine Corps to expand the study so that the presence or absence of a plume can be confirmed;
3. At sites where significant contamination is discovered present in the Water Table Aquifer, require the Marine Corps to conduct confirmatory studies in the underlying Tertiary Sand Aquifer;
4. At sites where significant contamination is documented, require the Marine Corps to define the direction and velocity of plume movement;
5. Request the Marine Corps to submit a revised schedule of work which realistically specifies when these technical evaluations will be completed;
6. Request that the Marine Corps explain what circumstances mandate corrective measures at a pollution site, and in fact what activities constitute remedial actions.

APPENDIX IX

DOC. NO.: CLEJ-00247-1.02 -10/25/85

Additionally, DEM will continue its effort to identify the off-base source which has contaminated the two Tarawa Terrace wells. Although the Solid and Hazardous Waste Management Branch, Department of Human Resources, is not actively involved in the NACIP program, it is requested that a copy of this report (when approved) be transmitted to Mr. Bill Meyer.

DOC. NO.: CLEJ-00247-1.02-10/25/85

17. MCAS Mercury Dump, Site No. 48

18. Hadnot Point Burn Dump, Site No. 28

19. Montford Point Burn Dump, Site No. 16

20. Courthouse Bay Liquid Disposal Area, Site No. 73

Priority is based on a consideration of the toxicity of the waste, the probability of groundwater quality violations, the proximity of the site to community water supply wells, and the proximity of the site to surface waters.

The data do not suggest that any of the contaminant plumes from the 38 sites have migrated off the MCB. However, it is probable that in one case a contaminant plume(s) from a dry cleaner(s) migrated onto the base and resulted in the contamination of two community water supply wells.

Eight (perhaps nine) community water supply wells at the MCB already have been impacted by these (and other unknown) waste sources. Additionally, another eighteen (18) wells are in jeopardy of being impacted.

It is evident, therefore, that DEM must commit the resources necessary to assure that the Marine Corps resolves its groundwater quality problems.

DEPARTMENT OF THE NAVY
NAVAL ENERGY AND ENVIRONMENTAL SUPPORT ACTIVITY
PORT HUENEME, CALIFORNIA 93043

IN REPLY REFER TO:

112N/WSE/pm
11100/1:273A
Ser: 245

23 FEB 1982

From: Officer in Charge
To: Commanding General, Marine Corps Base, Camp Lejeune, NC 28542

Subj: NACIP Initial Assessment Study, Marine Corps Base, Camp Lejeune

Encl: (1) Initial Assessment Study Team Member/Assignments Report Format

1. As discussed during the Command briefing, presented on 28 January 1982 at Camp Lejeune, NC, the Initial Assessment Study (IAS) is scheduled for 15-23 March 1982. Since the IAS will involve several area commands at Camp Lejeune, enclosure (1), Initial Assessment Study Team Member/Assignments Report Format, is provided to illustrate the general types of information that will be gathered during the study. As part of the IAS, the industrial, ordnance, material storage and waste disposal shops will be visited and both military and civilian personnel will be interviewed for knowledge in past waste disposal practices. In addition to the Marine Corps Base shops, the survey will include shops controlled by the Second Marine Division, Second Force Service Support Group, and Marine Corps Air Station (Helicoptor), New River.

2. It is requested that the Marine Corps Base inform Area Commands of the IAS Requirements. In addition, helicoptor flyover of Camp Lejeune is requested for 17 March 1982 for six members of the Survey Team.

3. For additional information concerning the IAS at Camp Lejeune contact Mr. Wallace Eakes at the Naval Energy and Environmental Support Activity (NEESA) at Autovon 360-3351, FTS 799-3351, or commercial 205-982-3351.

91 805

16 Helo Flight

Wallace Eakes

WALLACE EAKES
By direction

Copy to:
CMC (LFF2)
MCAS(H), S-4/LCOL Nelson, New River, NC
LANTDIVNAVFACENGCOM (114)

INITIAL ASSESSMENT STUDY

Team Member Assignments/Report Format

Activity: ____________________

Team Leader: ____________________

SECTION

1.0 INTRODUCTION....................................
2.0 SIGNIFICANT FINDINGS.................................... ____________
3.0 CONCLUSIONS... ____________
4.0 RECOMMENDATIONS... ____________
    4.1 General... ____________
    4.2 Non-Ordnance.. ____________
    4.3 Ordnance.. ____________
5.0 BACKGROUND.. ____________
    5.1 General... ____________
    5.2 History... ____________
    5.3 Physical Features................................... ____________
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        5.3.2 Climatology................................... ____________
        5.3.3 Topography.................................... ____________
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        5.3.6 Hydrology..................................... ____________
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        5.4.2 Threatened or Endangered Species.............. ____________
        5.4.3 Land Use, Impacts on Habitats................. ____________
    5.5 Legal Actions....................................... ____________
6.0 ACTIVITY FINDINGS....................................... ____________
    6.1 General... ____________

Enclosure (1)

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6.2.2 Demilitarization............................... ______________

6.2.3 Renovation..................................... ______________

6.2.4 Ranges, Impact Zones........................... ______________

6.2.5 Ordnance Disposal.............................. ______________

6.2.6 NBC agents..................................... ______________

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6.3.2 Metal Plating.................................. ______________

6.3.3 Degreasing..................................... ______________

6.3.4 Paint Shops.................................... ______________

6.3.5 Vehicle Maintenance Shops...................... ______________

6.3.6 Battery Shops.................................. ______________

6.3.7 Pest Control Shops............................. ______________

6.3.8 Electrical Shops............................... ______________

6.3.9 Print Shops.................................... ______________

6.3.10 Photo Shops................................... ______________

6.3.11 Boiler Plants, Power Plants................... ______________

6.3.12 Sewage Treatment Plants....................... ______________

6.3.13 Industrial Waste Treatment Plants............. ______________

6.3.14 Oilfield and Refinery Operations.............. ______________

6.3.15 Chemical Manufacturing or Formulating......... ______________

6.3.16 Firefighting Training......................... ______________

6.3.17 Incinerators.................................. ______________

6.3.18 Aircondition Refrigeration Shop............... ______________

6.3.19 Aircraft Maintenance Shops.................... CLW

6.3.20 Naval Air Rework Facilities................... ______________

6.3.20 Ship Intermediant Maintenance Facilities..... ____________

6.3.20 Air Intermediant Maintenance Facilities...... ____________

6.3.21 Fuel Farms/Gas Stations..................... ____________

6.3.22 Sanitation, Refuse and Garbage.............. ____________

6.3.23 Transportation Shop......................... ____________

6.3.24 Defense Property Disposal................... ____________

6.3.25 Paint Stripping and Sand Blasting........... ____________

6.3.26 Waste Fuel and Solvent Recycling............ ____________

6.3.27 Water Treatment Plants...................... ____________

6.3.28 Chemical Laboratories....................... ____________

6.3.29 Regional Medical/Dental Clinics............. ____________

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6.4.2 Special Med or Lab Radiolcgical Case......... ____________

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6.5.1 Magazine Storage............................. ____________

6.5.2 Supply Storage............................... ____________

6.5.2 POL Storage.................................. ____________

6.5.3 Hazardous Materials Storage.................. ____________

6.5.4 Storage lots................................. ____________

6.6 WASTE DISPOSAL OPERATIONS...................... ____________

6.6.1 General...................................... ____________

6.6.2 Disposal Sites............................... ____________

6.6.2.1 (A Description of each disposal site, length of use, quantity and type of material dumped) ____________

0166

01.01-08/11/83-02004

FAC/REA/hf
6280
1 1 AUG [illegible]

North Carolina Department of Human Resources
Division of Health Services
Solid & Hazardous Waste Management Branch
Attn: Mr. O. W. Strickland
P. O. Box 2091
Raleigh, NC 27602

Re: Initial Assessment Study,
U.S. Marine Corps Base,
Camp Lejeune, NC

Dear Mr. Strickland:

The subject report is provided for your information on previous storage, use, and disposal of chemicals and hazardous waste aboard Camp Lejeune. This study has been developed under the Navy Assessment and Control of Installation Pollutants (NACIP) Program. Initial screening has been completed for 76 potential sites to determine those sites requiring further study.

The study concludes that while none of the 76 sites pose an immediate threat to human health or the environment, 22 sites warrant further investigation to assess potential long-term impacts. A confirmation study of these sites, which are described in the enclosure, is currently underway with a target completion date of 1 October 1985. This study will include field investigations with detailed physical and chemical monitoring to confirm or deny the presence of contamination or a health hazard, and to quantify the extent of any problems that might exist. The need for performing mitigation actions or clean-up operations at these sites can then be addressed.

For further information regarding the enclosure or the continuing study, please contact Mr. Bob Alexander at 919-451-3034 or FTS 676-3034.

Sincerely,

M. G. LILLEY
Colonel, U.S. Marine Corps
Assistant Chief of Staff, Facilities
By direction of the Commanding General

Encl

Copy to: (w/o encl)
CMC (LFF-2)
COMLANTNAVFACENGCOM (114)
NAVENENVSA (112N)
CO, MCAS(H),NR (S-4)

Blind Copy to: (w/o encl)
SAFD
JPAO

DEPARTMENT OF THE NAVY FACILITIES ENGINEERING COMMAND

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APRIL 1983

INITIAL ASSESSMENT STUDY OF MARINE CORPS BASE CAMP LEJEUNE NORTH CAROLINA

NEESA 13—011

NAVAL ENERGY AND ENVIRONMENTAL SUPPORT ACTIVITY
Port Hueneme, California 93043

[redacted]

— Enclosure (20) —

RELEASE OF THIS DOCUMENT REQUIRES PRIOR NOTIFICATION

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ACTION LISTS                                   PigCHAMP 4.052-824 - 2-851             (C) 1985
FARM: 11                           Licensed to Coharie Farms
Page: 20                                      Printed: 2-824

Sows weaned but not served

 SOW ID  WEANED    DAYS OPEN      GROUP
------------   ---------   ---------   ------------
12868              2-813       11
12927              2-813       11
12959              2-813       11
13202              2-813       11
13371              2-813       11
13374              2-813       11
13378              2-813       11
13510              2-813       11
13601              2-813       11
13775              2-813       11
13805              2-813       11
13899              2-813       11
14312              2-813       11
14614              2-813       11
14719              2-813       11
14921              2-813       11
14952              2-813       11
14954              2-813       11
14955              2-813       11
14986              2-813       11
14994              2-813       11
15013              2-813       11
15044              2-813       11
15096              2-813       11
15747              2-813       11
15801              2-813       11
15802              2-813       11
15839              2-813       11
15875              2-813       11
15941              2-813       11
15962              2-813       11
15974              2-813       11
16048              2-813       11
16049              2-813       11
16078              2-813       11
16084              2-813       11
16092              2-813       11
16135              2-813       11
16148              2-813       11
16153              2-813       11
16161              2-813       11
16200              2-813       11
16204              2-813       11
16395              2-813       11
16944              2-813       11
17052              2-813       11
17077              2-813       11
17086              2-813       11
17141              2-813       11
17153              2-813       11
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SECTION 2. SIGNIFICANT FINDINGS

2.1 INTRODUCTION. Substantial information has been collected during this Initial Assessment Study (IAS). This chapter summarizes the information collected and it includes three sections:

1. Brief statements of significant facts;
2. Narrative discussion elaborating on the statements, and
3. Abbreviated descriptions of all sites judged to require further assessment (i.e., confirmation).

Information and data are presented in Section 6. Conclusions based on study findings are presented in Section 3.

2.2 GENERAL FINDINGS.

2.2.1 Potentially hazardous chemical wastes have been generated by military activities at Marine Corps Base (MCB) Camp Lejeune.

2.2.2 Seventy-six waste disposal sites have been identified; however, most (54) do not contain hazardous waste or do not pose a significant threat to human health or the environment.

2.2.3 Although sites were identified throughout the base, the air station and Hadnot Point areas had the largest number. Helicopter Outlying Landing Field (HOLF) Oak Grove does not contain any significant sites.

2.2.4 No industrial or municipal wastes were found to be migrating onto base property.

2.2.5 Past use of aircraft and tracked and wheeled vehicles has caused Petroleum, Oil, Lubricants (POL) contamination. These substances were involved in 10 of the 22 sites judged to require confirmation.

2.2.6 Contaminants from the chemical landfill (Site No. 69) are expected to move downgradient and away from the potable wells at the Rifle Range. (Defining movement of pollutants is addressed in more detail in Section 5.) On the basis of this preliminary study, these wells are not at risk from the chemical landfill wastes. The Rifle Range Dump (Site No. 68) west of Well Nos. RR-45 and RR-97, requires further investigation. Solvents buried at this site may have moved upgradient toward Well Nos. RR-45 and RR-97 during heavy groundwater withdrawal.

2.2.7 Ordnance operations are, in general, carefully controlled. However, there is evidence to indicate that limited disposal of some ordnance has occurred at one disposal site (Site No. 41). Potential adverse public health or environmental impacts can be minimized by carefully controlling any future digging or construction activities at the disposal area.

2.2.8 Confining beds separating the water table aquifer and the semiconfined aquifer are discontinuous at Camp Lejeune. This condition

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ACTION LISTS                                   PigCHAMP 4.052-824 - 2-851              (C) 1985
FARM: 11                           Licensed to Coharie Farms
Page: 21                                      Printed: 2-824

Sows weaned but not served

 SOW ID  WEANED    DAYS OPEN      GROUP
------------   ---------   ---------   ------------
17178              2-813       11
17205              2-813       11
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17277              2-813       11
17481              2-813       11
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192731             2-813       11
192963             2-813       11
192969             2-813       11
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51478              2-813       11
51713              2-813       11
950017             2-813       11
950037             2-813       11
950049             2-813       11
950057             2-813       11
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950074             2-813       11
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950271             2-813       11
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950446             2-813       11
950671             2-813       11
950746             2-813       11
951054             2-813       11
A141               2-813       11
13190              2-817        7
13314              2-817        7
13493              2-817        7
13516              2-817        7
13766              2-817        7
13774              2-817        7
13808              2-817        7
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INSTALLATION RESTORATION PROGRAM

BACKGROUND INFORMATION

1. In the early 1980's the Navy instituted a program to find any possible "Love Canals" aboard it's facilities. The program was called the Navy Assesment and Control of Installation Pollutants (NACIP). The program had three phases:

   a) Initial Assesment Study (IAS)
   b) Confirmation Study
   c) Remedial Measures

2. Camp Lejeune had a closed Chemical Landfill from the Naval Research Facility that had been located here. Therefore it was one of the first facilities to undergo the IAS which was completed in 1983 by Water and Air Research, Inc. of Gainesville, Florida

3. The IAS for Camp Lejeune discovered 75 abandoned disposal sites aboard the complex. It was decided that 22 of the 75 sites required further study, a confirmation study.

4. In 1984, the Confirmation Study was initiated on the 22 sites at Camp Lejeune by Environmental Science and Engineering, Inc. of Gainesville, Florida. It involved taking soil samples, digging shallow groundwater wells and sampling any existing wells (drinking water wells) in proximity to the sites.

5. On 30 Nov 84, Natural Resources received a call from LANTDIV that said that the initial results of Bldg 602, a drinking water well within a block of the Hadnot Point Fuel Farm, showed Benzene. Bldg 602 well was shut down.

6. On 4 Dec 84, the Hadnot Point Water Treatment Plant's raw and treated water was sampled as well as any drinking water wells within a mile of the Hadnot Point Fuel Farm or Bldg 602. The Bldg numbers sampled were:

601 602 608 634 642

7. On 6 Dec 84, the results were received. Trichloroethylene (TCE), Dichloroethylene (DCE) and Tetrachloroethylene (PCE) were found in the raw and treated water from the Hadnot Point Water Treatment plant and wells 601, 602 and 608. Wells 601 and 608 were shut down.

8. From 10-31 Dec 84, duplicate and quality control samples were run to confirm the presence of TCE, DCE and PCE in the wells. Wells 634 and 637, on the second sampling showed Methylene chloride. The wells were temporarily closed until it was determined that the methylene chloride was probably a laboratory contaminant. It was determined that all drinking water wells would be analyzed for volatile organic chemicals (VOCs) to start in January 1985.

9. 16 Jan 85. 37 wells serving the Hadnot Point and Holcomb Blvd water plants were sampled.

23 Jan 85. 21 wells serving the Onslow Beach, Courthouse Bay, Camp Johnson and Tarawa Terrace water plants were sampled.

10. On 27 Jan 85, the Chief of Staff of MCB detected a gasoline odor in the water in his quarters, serviced by the Holcomb Blvd water plant.

A fuel line running through the Holcomb blvd reservoir had leaked. The Holcomb Blvd plant was shut down and water was supplied by the Hadnot Point plant. The reservoir was flushed and scrubbed with high pressure hoses. The State of North Carolina was notified.

On 28 Jan 85, The State sampled the finished water at Holcomb Blvd plant and the Chief of Staff's quarters

11. 29 Jan 85. 25 wells serving the Marine corps Air Station, New River and Rifle Range water plants were sampled.

12. The State's results were received on 31 Jan 85, they didn't show any fuel but instead showed levels of TCE. Samples of Hadnot Point Water and Holcomb Blvd water were taken and driven to the State lab.

13. On 1 Feb 85, the 31 Jan 85 samples showed that there was still a contaminated well operating in the Hadnot Point system. The results of the 16 Jan 85 sampling were phoned into Natural Resources and showed high levels of TCE in 651.

Well 651 is located on the back side of DRMO's disposal storage lot. It was not initially sampled as being in proximity to a NACIP site. It had the highest levels of TCE found. The concentration was in the 17,000 to 18,000 ppb range. Well 651 was shut down. Well 634 showed TCE also and was shut down.

14. On 4 Feb 85, Holcomb Blvd and Hadnot Point plants and distribution systems were flushed and Holcomb Blvd was put back on line.

15. On 7 Feb 85, received results of 23 Jan 85 sampling which showed two wells in the Tarawa Terrace System contaminated with PCE, DCE and TCE. One was a brand new well. These wells were shut down.

16. From 8 Feb 85 through 31 March 85, more samples and results were received. All drinking water wells were sampled and analyzed for VOCs, if levels were found the well was shut down. This shut down one well at the Rifle Range, one at Marine Corps Air Station, New River, two wells at Tarawa Terrace and eight wells in the Hadnot Point system.

17. The historical data of Tarawa Terrace area did not show any possible sources for the PCE contamination. However across the road from Tarawa Terrace, off Camp Lejeune, were three dry cleaners. The State was brought in. In April 1985, the North Carolina Division of Environmental Management (DEM) sampled the

Tarawa Terrace wells. DEM recommended one well, TT-25, be regularily checked because it was probably the next well to get contaminated. The State initiated a study and determined that ABC Cleaners was the source of the PCE at Tarawa Terrace.

18. From April 1985 to 1987, the Base started monitoring the Hadnot Point and Tarawa Terrace treated water weekly for VOCs and TT-25 monthly.

19. January 1986, Natural Resources sampled all operating drinking water wells for VOCs.

20. The groundwater contamination that had been found in the Industrial Area, indirectly through NACIP, became a site in itself, now bringing the total to 23.

21. The Superfund Amendments Reauthorization Act (SARA) was enacted in 1986. Under SARA Congress established the Defense Environmental Restoration Account (DERA) to fund DOD cleanup sites. SARA also required that federal facilities' programs be consistent with EPA. This meant a revamping of NACIP. It now became the Installation Restoration Program which has three phases:

- a) Preliminary Assement/Site Investigation (PA/SI)
- b) Remedial Investigaion and Feasibility Study (RI/FS)
- c) Record of Decision and Remedial Action (RD/RA)

What was the IAS became the PA/SI. What was the Confirmation Study became the RI/FS. What was the Remedial Measures now was under part of the RI/FS and the balance was under RD/RA. What it meant to Camp Lejeune was that we now had 23 sites in RI/FS.

22. As the Supervisory Chemist understood it ESE was to sample all the drinking water wells on 1987.

23. Until 1987, the Safe Drinking Water Act and the applicable sections of the North Carolina Administrative Code did not address organic chemicals beyond trihalomethanes or the six listed pesticides. The Safe Drinking Water Act left the requirements for monitoring for the six listed pesticides to the states and North Carolina had not required Camp Lejeune to monitor for them. October 1987, the State initiated Synthetic Organic Chemicals (SOCs) monitoring requirements.

The SOC regulations require that the sample be analyzed for the eight regulated SOCs and thirty unregulated SOCs listed in the attachment. Then the system will be sampled every three months for a year for the eight regulated SOCs. If SOC are detected then monitoring will continue until otherwise directed by the State. If SOCs are not detected then monitoring will be done for a year every three or five years, to be determined by the State.

24. During 1987, the Holcomb Blvd expanded system started test operating, which meant that the Tarawa Terrace and Camp Johnson wells and plants were not operated. The expansion was offically

accepted and the Tarawa Terrace and Camp Johnson plants closed 1 April 1988.

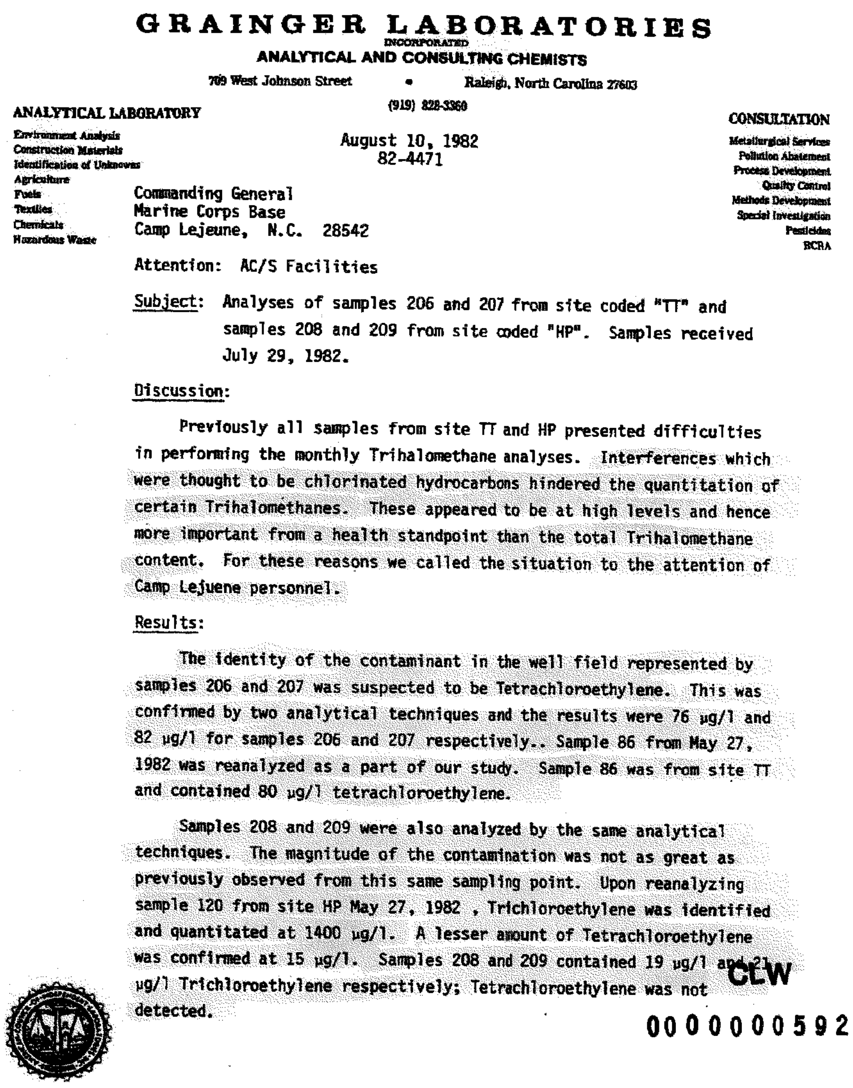
25. To comply with SOC regulations, the Holcomb Blvd, Hadnot Point and Marine Corps Air Station, New River were sampled in December 1987 for both the regulated and unregulated SOCs. They were also sampled in March, May and September 1988 for the regulated SOCs. Nothing was detected above detection levels. In the December 1987 sample from Hadnot Point trichloroethylene was found at 0.2 ppb. The detection level for TCE is 0.5 ppb so what was seen was seen below actually measureable levels.

26. In August 1988, well 603 and 642 were sampled and analyzed for VOCs, since they are the ones closest to the contamination. Nothing was found.

27. In 1988, Camp Lejeune was ranked by the EPA and was added to the National Priority List. This makes Camp Lejeune qualify for DERA funds.

28. To put all the water systems at Camp Lejeune on the same schedule all six systems were sampled for both the regulated and unregulated SOCs in March 1989. Nothing was detected above or below detection levels. The systems will be done once a quarter for the rest of the year.

0121



GRAINGER LABORATORIES
INCORPORATED
ANALYTICAL AND CONSULTING CHEMISTS
709 West Johnson Street • Raleigh, North Carolina 27603
(919) 828-3360

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- Special Investigation
- Pesticides
- RCRA

August 10, 1982
82-4471

Commanding General
Marine Corps Base
Camp Lejeune, N.C. 28542

Attention: AC/S Facilities

Subject: Analyses of samples 206 and 207 from site coded "TT" and samples 208 and 209 from site coded "HP". Samples received July 29, 1982.

Discussion:

Previously all samples from site TT and HP presented difficulties in performing the monthly Trihalomethane analyses. Interferences which were thought to be chlorinated hydrocarbons hindered the quantitation of certain Trihalomethanes. These appeared to be at high levels and hence more important from a health standpoint than the total Trihalomethane content. For these reasons we called the situation to the attention of Camp Lejuene personnel.

Results:

The identity of the contaminant in the well field represented by samples 206 and 207 was suspected to be Tetrachloroethylene. This was confirmed by two analytical techniques and the results were 76 µg/l and 82 µg/l for samples 206 and 207 respectively.. Sample 86 from May 27, 1982 was reanalyzed as a part of our study. Sample 86 was from site TT and contained 80 µg/l tetrachloroethylene.

Samples 208 and 209 were also analyzed by the same analytical techniques. The magnitude of the contamination was not as great as previously observed from this same sampling point. Upon reanalyzing sample 120 from site HP May 27, 1982 , Trichloroethylene was identified and quantitated at 1400 µg/l. A lesser amount of Tetrachloroethylene was confirmed at 15 µg/l. Samples 208 and 209 contained 19 µg/l and 21 µg/l Trichloroethylene respectively; Tetrachloroethylene was not detected.

Prior to this report, the samples from July 28, 1982 from site HP were analyzed. Traces of both solvents were found in this set. Though not quantitated, the level of Trichloroethylene seems to be in the range of that which was found in samples 208 and 209. The sample which showed the most contamination relative to the others was 205. Also sample 168 from site TT on July 28, 1982 was analyzed and shown to contain 104 µg/l Tetrachloroethylene.

Conclusion:

Tetrachloroethylene was identified as the contaminant in the well field coded "TT". Its concentration seems relatively stable over the period in which it has been examined. It was confirmed that the well field coded "HP" has shown contamination by Trichloroethylene and Tetrachloroethylene. These levels have been variable over the per studied and are now at significantly lower levels than when first encountered. The following table summarizes the findings:

Sample	Date Taken	Site Code	Tri chloroethylene	Tetra- chloroethylene
206	7-27-82	TT	-	76
207	7-27-82	TT	-	82
86	5-27-82	TT	-	80
168	7-28-82	TT	-	104
208	7-27-82	HP	19	<1
209	7-27-82	HP	21	<1
120	5-27-82	HP	1400	15
205	7-28-82	HP	No Data	1.0

Bruce A. Babson

Bruce A. Babson
Chemist

BAB/ab
Customer #92400

0126

Date: 19 August 1982

Memorandum

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

To: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMaintDiv

Subj: Grainger Laboratories Letter of 10 August 1982

Encl: (1) Subject Letter
(2) SNARL for Trichloroethylene
(3) SNARL for Tetrachloroethylene
(4) Suggested Action Guidance-Tetrachloroethylene

1. On 6 May 1982, Mike Hargett, of Grainger Labs, called and informed me that on 3 May 1982, while they were analyzing the first set of Trihalomethane samples received from us, interferences possibly from chlorinated hydrocarbons hindered analysis of samples from two systems, Tarawa Terrace and Hadnot Point.

2. It was determined that raw and treated samples from the treatment plants for the two systems would be taken for analysis of the interferring chlorinated hydrocarbons. On 28 July 1982, a raw water sample, #206, and a treated water sample, #207, were taken at the Tarawa Terrace water treatment plant. A raw water sample, #208, and a treated water sample, #209, were taken at the Hadnot Point water treatment plant, on 28 July 1982. The Trihalomethane samples for July were also taken on 28 July 1982, for these two systems. In Grainger's letter, of 10 August 1982, they erroneous report the samplessas taken on 27 July 1982, they were collected and shipped on 28 July 1982.

3. Analysis of the above samples and some Grainger had preserved showed that in the Tarawa Terrace water treatment plant and system, the interferring chlorinated hydrocarbon is tetrachloroethylene, or otherwise known as perchloroethylene. Tetrachloroethylene is used as a dry cleaning and degreasing solvent, and heat-transfer medium, Analysis of the Hadnot Point water treatment plant and system samples showed Trichloroethylene and low levels of tetrachloroethylene. Trichloroethylene is used primarily as a metal degreaser. It is also used as a dry-cleaning solvent and a type of pesticide, fumigant.

4. Neither tri- or tetrachloroethylene are regulated contaminants under the Safe Drinking Water Act. However, EPA has a "SNARLS" program which provides some guidance on unregulated contaminants. A snarl is a suggested no adverse response level and is not a legally enforceable standard. Snarl values are usually provided for 1-day, 10-day, and longer-term exposure periods.

5. Tetrachloroethylene, in high doses, has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for tetrachloroethylene are 2300 ug/l for 1-day, 175 ug/l for 10-days, and 20 ug/l for longer-term where drinking water is the only source of exposure. On 9 April 1980, EPA came out with a Suggested Action Guidance on Tetrachloroethylene. [illegible]idance was a result of possible tetrachloroethylene contamination of drinking water

where coated A/C pipe was used. Their recommendations were (1) immediate corrective action(within 24 hours) if the Tetrachloroethylene level exceeds 2.3 mg/l (same as 1-day snarl) (2) corrective action within 10 days if the tetrachloroethylene level exceeds 0.13 mg/l (same as 10 day snarl) (3) for extended periods the tetrachloroethylene level should not be greater than 0.04 mg/l.

6. Trichloroethylene, like tetrachloroethylene and other halogenated hydrocarbons (ie Trihalomethands), at high levels , has been reported to produce liver and kidney damage and central nervous system disturbances in humans. EPA's snarls for trichloroethylene were determined to be 2 mg/l for 1-day, 0.2 mg/l for 10-day, and 75 ug/l for a chronicsamstl. There is no Suggested Action Guidance on trichloroethylene.

7. Below is a table of the results received from Grainger labs.

Sample #	Sample Date	WTP	Sample Site	_chloroethylene, ug/l Tri-	 Tetra-
86	5-28-82	TT	Distribution Point, Bldg TT-2453	-	80
168					
168	7-28-82	TT	Distribution Point, Bldg TT-2453	-	104
206	7-28-82	TT	Raw Water @ Plant	-	76
208	7-28-82	TT	Treated Water @ Plant	-	82
120	5-27-82	HP	Distribution Point, Bldg NH-1	1400	15
205	7-28-82	HP	Distribution Point, Bldg FC-530	No Data ?	100
208	7-28082	HP	Raw Water @ Plant	19	<1
209	7-28-82	HP	Treated Water @ Plant	21	<1

What Grainger means by no data for trichloroethylene analysis for sample #205 is that Trihalomethane samples 201-205, from Hadnot Point, were analyzed qualititively for trichloroethylene, but exact quantities were not determined. According to a phone conversation on 19 August 1982, with Bruce Babson of Grainger Labs and myself, samples 201-205 were in the range of 208 and 209 for Trichloroethylene, and of samples 201-205, 205 had the most contamination.

8. The level of tetrachloroethylene for the Tarawa Terrace system samples averaged 0.09 mg/l, which exceeded the recommended level of 0.04 mg/l. The levels do not vary significantly between the raw and treated samples. The raw and treated samples were taken at the plant where the water had already traveled some distance in pipes. Therefore, with no significant difference between raw and treated samples and the high average of 0.09 mg/l, I would believe the tetrachloroethylene contamination is possibly do to the use of coated A/C pipe in the raw water lines at Tarawa Terrace.. Tetrachloroethylene, in the Hadnot Point system samples is at trace levels and well under recommended levels.

9. The level of trichloroethylene, at Hadnot Point, is presently averaging 20 ug/l, which is below all three recommended snarls; 1-day, 10-day, and chronic. No explaination is offered for the 1400 ug/l level on 27 May 1982, or why it is now averaging only 20 ug/l.

Elizabeth A. Betz
Supervisory Chemist

Control Lab, RALAD
-8370
mber 16, 1983
e 2

RESULTS
(Continued)

Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
423	29	9	3	<1	41
424	33	11	3	<1	47
425	33	11	3	<1	47
426	40	13	4	<1	57
427	36	12	4	<1	52
428	16	9	5	<1	30
429	17	9	5	<1	31
430	15	8	4	<1	27
431	16	9	5	<1	30
432	29	15	8	<1	52
433	12	2	<1	<1	14
435	40	5	2	<1	47
436	41	10	2	<1	53
437	20	<1	<1	<1	20
438**	21	≤15	2	<1	≤38
439**	27	≤15	2	<1	≤44
440**	22	≤15	2	<1	≤39
441**	22	≤15	2	<1	≤39
442**	23	≤15	3	<1	≤41

* All samples from this site exhibit contamination from Tetrachloroethylene.

** All samples from this site exhibit contamination from both Trichloroethylene and Tetrachloroethylene. The reported values for Bromodichloromethane and Total Trihalomethane are probable upper limits on the concentrations for these parameters.

NOTE: All results reported in micrograms per liter.
Analysis completed 9/8/83.

Bruce A. Babson
Bruce A. Babson
Laboratory Supervisor

CLW

BAB/at
cc: Elizabeth Betz

RESULTS
(con't)

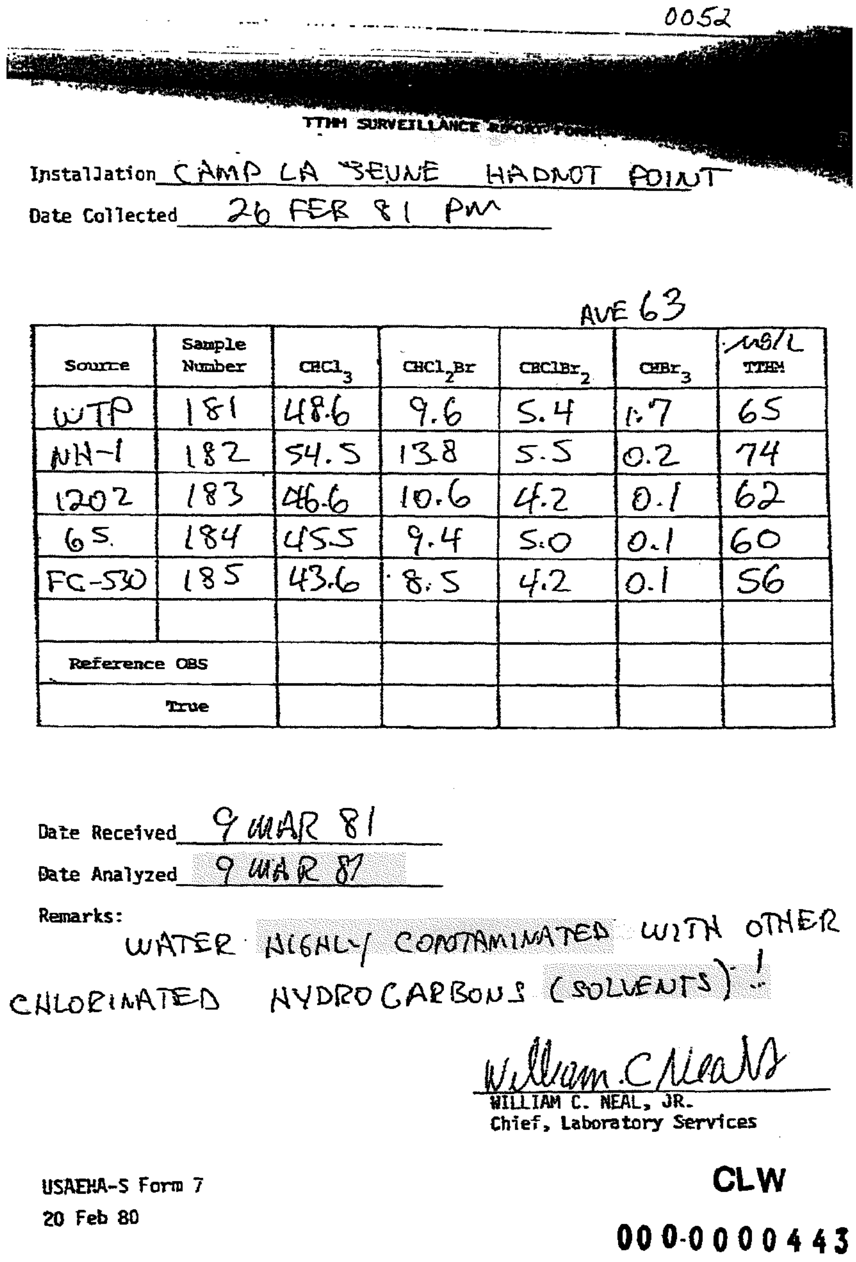
Sample	Chloroform	Bromodichloro-methane	Chlorodibromo-methane	Bromoform	Total Trihalo-methane
286	21	11	5	<1	37
287	21	11	5	<1	37
288	21	11	4	<1	36
289	26	13	5	<1	44
290	45	20	8	<1	73
291	20	5	2	<1	27
292	28	3	1	<1	32
293	32	7	1	<1	40
294	38	5	1	<1	44
295	37	3	<1	<1	40
**296	20	<20	<5	<1	<45
**297	22	<20	<5	<1	<42
**298	29	<20	<5	<1	<54
**299	20	<20	<5	<1	<45
**300	28	<30	<5	<1	<53

---

*All samples from this site show contamination from Tetrachloroethylene. This compound interferes with the determination of Chlorodibromomethane. The reported value represents a probable maximum on the level of this trihalomethane.

**All samples from this site show contamination from Trichloroethylene and Tetrachloroethylene. These compounds interfere with the determinations for both Bromodichloromethane and Chlorodibromomethane. The reported values represent a probable maximum on the levels of these two trihalomethanes.

NOTE: All results reported in micrograms per liter. Analysis completed 12/8/82.



0052

TTHM SURVEILLANCE REPORT FORM

Installation CAMP LA JEUNE HADNOT POINT

Date Collected 26 FEB 81 PM

AVE 63

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	µg/L TTHM
WTP	181	48.6	9.6	5.4	1.7	65
NH-1	182	54.5	13.8	5.5	0.2	74
1202	183	46.6	10.6	4.2	0.1	62
65	184	45.5	9.4	5.0	0.1	60
FC-530	185	43.6	8.5	4.2	0.1	56
Reference OBS						
True						

Date Received 9 MAR 81

Date Analyzed 9 MAR 81

Remarks:
WATER HIGHLY CONTAMINATED WITH OTHER CHLORINATED HYDROCARBONS (SOLVENTS)!

William C Neal Jr
WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80

TTHM SURVEILLANCE REPORT FORM

Installation CAMP LA JEUNE - HADNOT PT

Date Collected 29 JAN 81 PM

HEAVY INTERFERENCE

Source	Sample Number	$CHCl_3$	✓ $CHCl_2Br$	$CHClBr_2$	$CHBr_3$	ug/L TTHM
WTP	161	22.7	?	6.2	0.9	30 +
NH-1	162	27.2	?	6.3	0.8	34+
1202	163	23.8	?	6.6	0.9	31+
65	164	24.3	?	6.8	0.9	32+
FC-530	165	27.5	?	7.2	1.0	36+
Reference OBS						
True						

Dichlorobromomethane

Date Received 30 JAN 81

Date Analyzed 9 FEB 81

Remarks: YOU NEED TO ANALYZE FOR CHLORINATED ORGANICS BY GC/MS.

WILLIAM C. NEAL, JR.
Chief, Laboratory Service

USAEHA-S Form 7
20 Feb 80

TTHM SURVEILLANCE REPORT FORM

Installation MCB - LA JEUNE - HADNOT POINT

Date Collected 21 OCT 80 PM

AVE 34 APPROX.

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	TTHM
WTP	086	18.6	138 (8)	5.1	0.3	32
HOSP NH-1	087	20.6	138 (9)	6.3	0.6	36
1202	088	19.3	138 (8)	5.4	0.3	33
65	089	18.8	137 (8)	5.5	0.4	33
FC-530	090	18.7	136 (8)	5.7	0.4	33
Reference OBS						
True						

Date Received 30 OCT 80

Date Analyzed 31 OCT 80

Remarks: WATER IS HIGHLY CONTAMINATED WITH LOW MOLECULAR WEIGHT HALOGENATED HYDROCARBONS. STRONG INTERFERENCE IN THE REGION OF $CHCl_2Br$.

William C Neal Jr
WILLIAM C. NEAL, JR.
Chief, Laboratory Services

CANNOT DETERMINE TRUE VALUE OF THAT COMPOUND. EXPERIENCE SHOWS THAT THE TRUE CONCENTRATION IS LOW, SINCE THE

0048
NAVY

TTHM SURVEILLANCE REPORT FORM

Installation CAMP LEJEUNE - HADNOT POINT
Date Collected 18 DEC 80 PM

Source	Sample Number	$CHCl_3$	$CHCl_2Br$	$CHClBr_2$	$CHBr_3$	μg/L TTHM
WTP	N 111	20.0	?	6.2	1.0	27 +
NH-1	112	18.7	?	7.0	1.2	25 +
1202	113	19.3	?	6.8	1.1	27 +
65	114	19.9	?	6.4	1.0	27 +
FC-530	115	19.8	?	7.3	1.2	28 +
Reference OBS						
True						

Date Received 29 DEC 80
Date Analyzed 5 JAN 81
Remarks: 22

HEAVY ORGANIC INTERFERENCE AT CHCl2Br. YOU NEED TO ANALYZE FOR CHLORINATED ORGANICS BY GC/MS. William C Neal Jr

WILLIAM C. NEAL, JR.
Chief, Laboratory Services

USAEHA-S Form 7
20 Feb 80

Doc. No.: CLCJ-~~00~~248-1.02-10/31/80 0044

JENNINGS LABORATORIES, INC.
ANALYTICAL AND CONSULTING CHEMISTS
1118 CYPRESS AVENUE • P.O. BOX 851 • VIRGINIA BEACH, VA. 23451 • PHONE (804) 425-1498

VA (EPA) CERTIFIED LABORATORY for Drinking Water Analysis - Microbiological, Inorganic and Organic
ASBESTOS ANALYSIS – NIOSH 382

Official Referee Chemists for:
AMERICAN OIL CHEMISTS SOCIETY
NATIONAL SOYBEAN PROCESSORS ASSOCIATION

Laboratory Certified by VA. STATE WATER CONTROL BOARD for Analysis of Effluents for NPDES PERMITS
CERTIFIED OFFICIAL U.S.D.A. LABORATORY FOR MEAT ANALYSIS

CERTIFICATE OF ANALYSIS

TO:
Mr. Dave Goodwin
Building N-23 Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia 23511

DATE: October 31, 1980

SAMPLE OF: WATER SAMPLES (8) FOR COMPOSITE FOR PRIORITY POLLUTANT SCAN

MARKED: Listed below

Samples picked up October 1, 1980

OFFICIAL SAMPLE BY:

EIGHT (8) SAMPLES OF WATER TO BE COMPOSITED AS PER INSTRUCTIONS:

SAMPLE MARKED	QUARTS	LOCATION	QUANTITY
#1	2	Hadnot Point Bldg 20	1552 ml
#2	1	Hadnot Point Bldg 670	708 ml
#3	1	Tarawa Terrace TT-38	452 ml
#4	1	Monford Point M-178	220 ml
#5	1	MCAS(H) Bldg 110	664 ml
#6	1	Courthouse Bay BB-190	132 ml
#7	1	Rifle Range RR-85	220 ml
#8	1	Onslow Beach BA-138	52 ml
			4000 ml

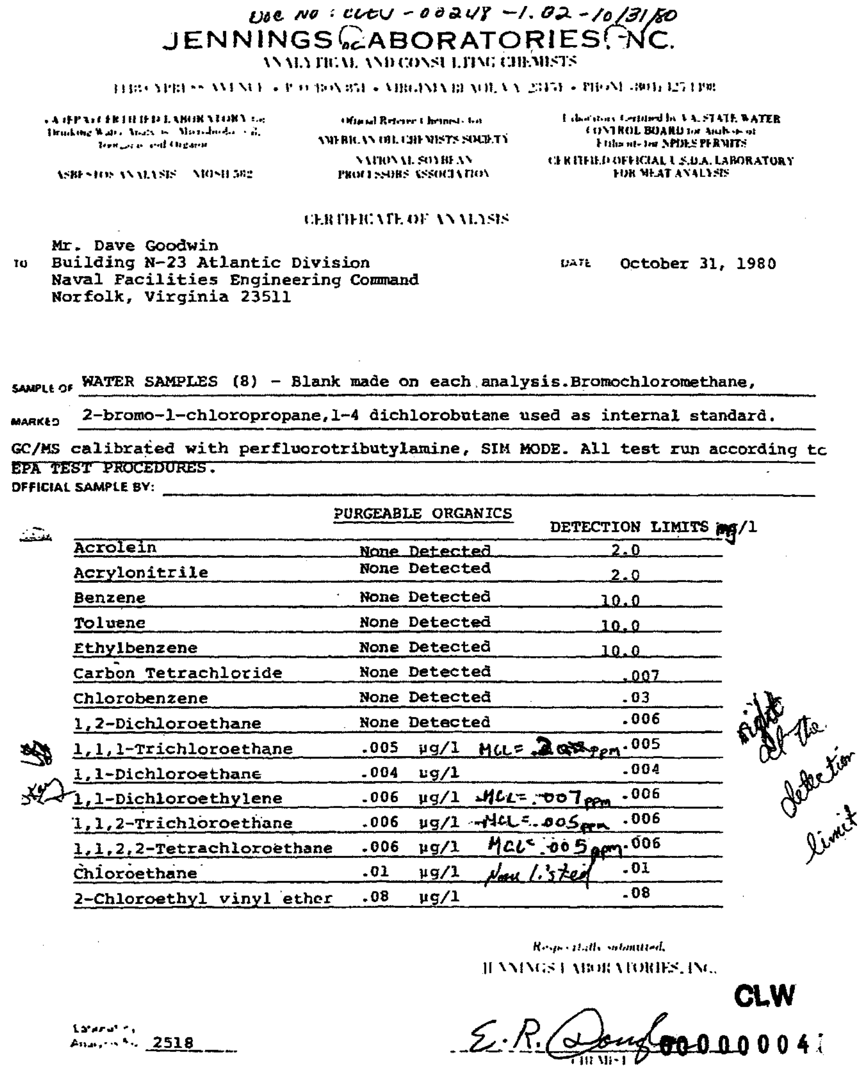
Pump house or separator

Administrative Record May 11, 1992
Section 1.0
Site 12 ~~A~~B in vol A,B

Respectfully submitted,
JENNINGS LABORATORIES, INC.

E. R.
CHEMIST

Laboratory Analysis No. 2518



Doc No : CLCU - 00248 - 1.02 - 10/31/80

JENNINGS LABORATORIES, INC.

ANALYTICAL AND CONSULTING CHEMISTS

[illegible]

EPA CERTIFIED LABORATORY for Drinking Water Analysis - Microbiological, Inorganic and Organic

ASBESTOS ANALYSIS NIOSH 582

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CERTIFICATE OF ANALYSIS

TO Mr. Dave Goodwin
Building N-23 Atlantic Division
Naval Facilities Engineering Command
Norfolk, Virginia 23511

DATE October 31, 1980

SAMPLE OF WATER SAMPLES (8) - Blank made on each analysis. Bromochloromethane,

MARKED 2-bromo-1-chloropropane, 1-4 dichlorobutane used as internal standard.

GC/MS calibrated with perfluorotributylamine, SIM MODE. All test run according tc EPA TEST PROCEDURES.

OFFICIAL SAMPLE BY:

	PURGEABLE ORGANICS			DETECTION LIMITS µg/1
Acrolein	None Detected			2.0
Acrylonitrile	None Detected			2.0
Benzene	None Detected			10.0
Toluene	None Detected			10.0
Ethylbenzene	None Detected			10.0
Carbon Tetrachloride	None Detected			.007
Chlorobenzene	None Detected			.03
1,2-Dichloroethane	None Detected			.006
1,1,1-Trichloroethane	.005	µg/1	MCL = .200 ppm	.005
1,1-Dichloroethane	.004	µg/1		.004
1,1-Dichloroethylene	.006	µg/1	MCL = .007 ppm	.006
1,1,2-Trichloroethane	.006	µg/1	MCL = .005 ppm	.006
1,1,2,2-Tetrachloroethane	.006	µg/1	MCL = .005 ppm	.006
Chloroethane	.01	µg/1	Non Listed	.01
2-Chloroethyl vinyl ether	.08	µg/1		.08

right at the detection limit

Respectfully submitted,
JENNINGS LABORATORIES, INC.

E. R. Douglas
CHEMIST

Laboratory Analysis No. 2518

Doc No: CLEJ-00248 - 1.02 - 10/31/80

[illegible] LABORATORIES, INC.

PURGEABLE ORGANICS (continued)				DETECTION LIMITS µg/l
Chloroform	None Detected			.010
1,2-Dichloropropane	None Detected			.004
1,3-Dichloropropane	None Detected			.006
Methylene Chloride	None Detected			.010
Methyl Chloride	None Detected			.009
Methyl Bromide	None Detected			.03
Bromoform	None Detected			.02
Dichlorobromomethane	None Detected			.006
Trichlorofluoromethane	None Detected			.03
Dichlorodifluoromethane	None Detected			.01
Chlorodibromomethane	None Detected			.01
Tetrachloroethylene	None Detected			.007
Trichloroethylene	.005	µg/l	.005 = MCL	.005
Vinyl Chloride	.01	µg/l	.002 = MCL	.01
1,2-trans-Dichloroethylene	.006	µg/l	.100 = MCL	.006
bis(chloromethyl)ether	.003	µg/l	2.0×10^{-7} = MCL	.003

BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS

1,2-Dichlorobenzene	None Detected	.04
1,3-Dichlorobenzene	None Detected	.04
1,4-Dichlorobenzene	None Detected	.04
Hexachloroethane	None Detected	.001
Hexachlorobutadiene	None Detected	.001
Hexachlorobenzene	None Detected	.002
1,2,4-Trichlorobenzene	None Detected	.006
Bis(2-Chloroethoxy)methane	None Detected	.40
Naphthalene	None Detected	.04
2-Chloronaphthalene	None Detected	.04
Isophorone	None Detected	5.0
Nitrobenzene	None Detected	5.0
2,4-Dinitrotoluene	None Detected	.06
2,6-Dinitrotoluene	None Detected	.06

LAB # 2518

BY E. R.

JENNINGS LABORATORIES, INC.

BASE/NEUTRAL EXTRACTABLE ORGANIC COMPOUNDS (continued)

		DETECTION LIMIT	
4-Bromophenyl phenyl ether	None Detected	1.1	µg/l
bis(2-Ethylhexyl)phthalate	None Detected	.02	
Di-n-octyl phthalate	None Detected	.11	
Dimethyl phthalate	None Detected	.11	
Diethyl phthalate	None Detected	.13	
Di-n-butyl phthalate	None Detected	.02	
Fluorene	None Detected	.04	
Fluoranthene	None Detected	.04	
Chrysene	None Detected	.04	
Pyrene	None Detected	.04	
Phenathrene	None Detected	.04	
Anthracene	None Detected	.04	
Benzo(a)anthracene	None Detected	.04	
Benzo(b)fluoranthene	None Detected	.04	
Benzo(k)fluoranthene	None Detected	.04	
Benzo(a)pyrene	None Detected	.04	
Ideno(1,2,3-c,d)pyrene	None Detected	.10	
Dibenzo(a,h)anthracene	None Detected	.10	
Benzo(g,h,i)perylene	None Detected	.10	
4-Chlorophenyl phenyl ether	None Detected	2.2	
3,3'-Dichlorobenzidine	None Detected	.04	
Benzidine	None Detected	.04	
Bis(2-Chloroethyl)ether	None Detected	.04	
1,2-Diphenylhydrazine	None Detected	.04	
Hexachlorocyclopentadiene	None Detected	.04	
N-Nitrosodiphenylamine	None Detected	1.0	
Acenaphthylene	None Detected	.04	
Acenaphthene	None Detected	.04	
Butyl benzyl phthalate	None Detected	.04	
N-Nitrosodimethylamine	None Detected	.2	
N-Nitrosodi-n-propylamine	None Detected	.5	
bis(2-Chloroisopropyl) ether	None Detected	.9	

LAB # 2518

BY E. R. Douglas
Chemist

DOE NO: CLEJ-00248-1.02-10/31/80

JENNINGS LABORATORIES, INC.

	PESTICIDES/PCB's (Continued)	DETECTION LIMITS µg/l
Aroclor 1016	None Detected	.04
Aroclor 1221	None Detected	.10
Aroclor 1232	None Detected	.10
Aroclor 1242	None Detected	.06
Aroclor 1248	None Detected	.08
Aroclor 1254	None Detected	.08
Aroclor 1260	None Detected	.15
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	None Detected	.003

	METALS		DETECTION LIMITS mg/l
Antimony	0.2	mg/l	0.2
Arsenic	<0.002	mg/l	0.002
Beryllium	<0.005	mg/l	0.005
Cadmium	0.006	mg/l	0.002
Chromium	<0.02	mg/l	0.02
Copper	<0.01	mg/l	0.01
Lead	<0.005	mg/l	0.005
Mercury	<0.002	mg/l	0.002
Nickel	<0.02	mg/l	0.02
Selenium	0.008	mg/l	0.002
Silver	<0.01	mg/l	0.01
Thallium	<0.1	mg/l	0.1
Zinc	0.005	mg/l	0.005

	MISCELLANEOUS	
Total Cyanides	None Detected	0.01
Asbestos (fibrous)	None Detected	
Total Phenols	None Detected	0.005

LAB# 2518

BY ____________ CLW
CHEMIST

[illegible] 10/31/80

JENNINGS LABORATORIES, INC.

ACID EXTRACTABLE ORGANIC COMPOUNDS

		DETECTION LIMITS μg/l
Phenol	NONE DETECTED	1.4
2-Nitrophenol	None Detected	2.5
4-Nitrophenol	None Detected	2.5
2,4-Dinitrophenol	None Detected	7.0
4,6-Dinitro-o-cresol	None Detected	2.0
Pentachlorophenol	None Detected	10.0
p-Chloro-m-cresol	None Detected	.01
2-Chlorophenol	None Detected	2.0
2,4-Dichlorophenol	None Detected	2.1
2,4,6-Trichlorophenol	None Detected	3.0
2,4-Dimethylphenol	None Detected	1.7

PESTICIDES/PCB's

α-Endosulfan	None Detected	.005
β-Endosulfan	None Detected	.01
Endosulfan sulfate	None Detected	.03
α-BHC	None Detected	.002
β-BHC	None Detected	.004
δ-BHC	None Detected	.004
γ-BHC	None Detected	.002
Aldrin	None Detected	.003
Dieldrin	None Detected	.006
4,4'-DDE	None Detected	.006
4,4'-DDD	None Detected	.012
4,4'-DDT	None Detected	.016
Endrin	None detected	.009
Endrin Aldehyde	None Detected	.023
Heptachlor	None Detected	.002
Heptachlor Epoxide	None Detected	.004
Chlordane	None Detected	.04
Toxaphene	None Detected	.40

LAB # 2518

BY E. R. [illegible]
CHEMIST

0130

Date: 31 August 1982

Memorandum

From: Ms. Betz, Quality Control Lab., Environmental Section, NREAB, BMaintDiv

To: Mr. Sharpe, Supervisory Ecologist, Environmental Section, NREAB, BMAintDiv

Subj: LANTNAVFACENGCOM ltr 12 Aug 1982

1. The analysis results enclosed in the letter of 12 August 1982 was initiated by LANTNAVFACENGCOM. Lant Div was concerned that after the State of North Carolina received primacy for the Safe Drinking Water Act, the State might find a problem with the potable water at MCB Camp Lejeune that the Navy had not previously uncovered. With primacy, the State would have the right to sample and run analysis on MCB Camp Lejeune potable water for any parameters under the Safe Drinking Water Act.

2. On 1 October 1980, Lant Div arrived and explained that sampling of all eight systems would be done. One composite sample would be made and a full spectrum analysis would be run. If any parameters showed potential problems, further analysis of the eight individual system samples would be done to locate the source of the problem. Sampling was done by J. H. Parrish, of Lant Div. He was accompanied by Mack Frazelle, of the Water Treatment Section, and Elizabeth Betz, of the Quality Control Lab.

3. The costs of and analysis by Jennings Laboratories were arranged by Lant Div. Results of the analysis were never received by MCB Camp Lejeune. During Wallace Carter's Visit, of 16-18 June 1982, a request was made by Danny Sharpe, of the Environmental Section, for a copy of the 1 October 1980 results.

4. The eight system composite sample showed either none detected, little detected below detectable limits, or at detectable limits for all parameters except for Cadmium and Selenium. Both Cadmium and Selenium were below the 0.010 mg/l maximum contaminant level required by the Safe Drinking Water Act.

5. The only question I have is how did Lant Div arrive at the volumes to use in making the composite sample. The percent of total volume used is not directly related to the percent of the total Camp Lejeune population served or the ~~percent~~ ~~of~~ daily flows of each system.

6. In Summary, the 1980 analysis shows no problems for the priority pollutants listed for the eight systems at MCB Camp Lejeune as a whole. Let me point out that this may not hold true for each system individually. The 1980 analysis, for example, showed none detected for the 4 trihalomethanes (chloroform, Dichlorobromomethane, chlorodibromomethane & bromoform) overall and other more recent analysis shows the New River Air Station system at the maximum contaminant level.

Elizabeth A. Betz
Supervisory Chemist

Composite Samples from
1 Oct 1980 of
Drinking Water.

No recommended action
From Lant Div. See No reason
Not to Concur Sharpe

Table 3. Sample Size Worksheet

Target: Identify 10,000/12,000 (83 %) births. 5,000 will be unexposed.

Age	Baseline Incidence rate	Person-years*	Expected Unexposed cases	Expected Exposed cases (If no elevation in risk)
0-4 years	7.1/100,000	25,000	1.8	1.8
5-9 years	3.9/100,000	25,000	1.0	1.0
10-14 years	2.3/100,000	24,510	0.6	0.6
15-19 years	2.1/100,000	11,550	0.2	0.2
All ages:			3.6	3.6

Power Calculation Using Internal Comparison Group

Odds Ratio	Expected Exposed Cases	Power to detect when one-tailed alpha = .05
2.0	2(3.6) = 7.2	.12
3.0	3(3.6) = 10.8	.57
5.0	5(3.6) = 18	.79

Power Calculation Using External Comparison Group

Odds Ratio	Expected Exposed Cases (When risk does not differ from baseline)	Power to detect when one-tailed alpha = .05
2.0	3	.39
3.0	3	.79
5.0	3	.99
2.0	4	.41
3.0	4	.84
5.0	4	1.0

* Person-years declines because some cohort members will be younger than 19.

Exhibit # 19

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DEPARTMENT OF THE NAVY
Bureau of Medicine and Surgery
Washington, D.C. 20390

BUMEDINST 6240.3C CH-1
722-PAT:cb
13 December 1972

BUMED INSTRUCTION 6240.3C
CHANGE TRANSMITTAL 1

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Standards for potable water

1. **Purpose.** To promulgate change 1 to the basic instruction to eliminate possible confusion concerning how nitrate and nitrite levels are to be determined. These levels are to be expressed as nitrate nitrogen or nitrite nitrogen which is in consonance with current testing procedures.

2. **Action.** On page 4, table, line 12, opposite entry for Nitrate and Nitrite, in the Concentration column, to present "10." add "(as N)" so that it will read:

10. (as N)

G. M. DAVIS

Distribution:
~~SNDL Parts 1 and 2~~
MARCORPS Code CC (less MarBks)

Stocked:
COMNAVDIST WASH DC
(Supply & Fiscal Dept.—Code 514.3)
Wash. Navy Yard
Wash., D.C. 20390

(1)

DEPARTMENT OF THE NAVY
Bureau of Medicine and Surgery
Washington, D.C. 20390

BUMEDINST 6240.3C
722-PAT:cb
25 August 1972

BUMED INSTRUCTION 6240.3C

From: Chief, Bureau of Medicine and Surgery
To: All Ships and Stations

Subj: Standards for potable water

• Ref: (a) NAVMATINST 5711.9A of 17 June
• 1965 (NOTAL)
• (b) BUMEDINST 5711.2A of 3 December
• 1965

1. Purpose. To establish standards for water for •
• drinking and culinary purposes throughout the Naval •
• Establishment and prescribe the use of the DD Form
• 686, Bacteriological Examination of Water, and DD
• Form 710, Physical and Chemical Analysis of Water.

• 2. Cancellation. BUMED Instructions 6240.3B and
• 6240.5 are canceled.

3. Background

a. Policy. The Department of Defense has established the policy of compliance by the Military Departments with United States Public Health Service Drinking Water Standards, as may be modified by the Medical Services of the Departments, or as may be modified by competent authority for purposes of international agreement.

b. **International Agreement.** Naval Tripartite Standardization Agreement ABC-NAVY-STD-23A was promulgated by references (a) and (b). The object of the agreement is to provide the United States Navy, the Royal Navy, and the Royal Canadian Navy assurance that drinking and culinary water delivered to each other's ships from installations under their cognizance meets certain minimum standards of quality.

4. **Quality Standards.** The standards for bacteriological quality, physical and chemical characteristics, and radioactivity shall be those in "Public Health Service Drinking Water Standards, 1962" Department of Health, Education, and Welfare. The Standards, as modified, may be found in NAVMED P-5010-5, Water Supply Ashore, available through the Navy Supply System.

5. Definition of Terms. The following terms are defined for clarification in interpretation of standards:

a. Adequate protection by natural means involves one or more of the following processes of nature that produce water consistently meeting the requirements of these standards: dilution, storage, sedimentation, sunlight, aeration, and the associated physical and biological processes which tend to accomplish natural purification in surface waters and, in the case of ground waters, the natural purification of water by infiltration through soil and percolation through underlying material and storage below the ground water table.

b. Adequate protection by treatment means any one or any combination of the controlled processes of coagulation, sedimentation, absorption, filtration, disinfection, or other processes which produce a water consistently meeting the requirements of these standards. This protection also includes processes which are appropriate to the source of supply; works which are of adequate capacity to meet maximum demands without creating health hazards, and which are located, designed, and constructed to eliminate or prevent pollution; and conscientious operation by well trained and competent personnel whose qualifications are commensurate with the responsibilities of the position.

c. The coliform group includes all organisms considered in the coliform group as set forth in Standard Methods for the Examination of Water and Wastewater, current edition, prepared and published jointly by the American Public Health Association, American Water Works Association, and Water Pollution Control Federation.

d. Health hazards mean any conditions, devices, or practices in the water supply system and its operation which create, or may create, a danger to the health and well-being of the water consumer. An example of a health hazard is a structural defect in the water supply system, whether of location, design, or construction, which may regularly or occasionally prevent satisfactory purification of the water supply or cause it to be polluted from extraneous sources.

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(2)

e. Pollution, as used in these standards, means the presence of any foreign substance (organic, inorganic, radiological, or biological) in water which tends to degrade its quality so as to constitute a hazard or impair the usefulness of the water.

f. The standard sample for the bacteriological test shall consist of:

(1) For the bacteriological fermentation tube test, five standard portions of either:

- (a) 10 milliliters
- (b) 100 milliliters

(2) For the membrane filter technique, not less than 50 milliliters.

g. Water supply system includes the works and auxiliaries for collection, treatment, storage, and distribution of the water from the sources of supply to the freeflowing outlet of the ultimate consumer.

6. Source and Protection

a. The water supply should be obtained from the most desirable source which is feasible, and effort should be made to prevent or control pollution of the source. If the source is not adequately protected by natural means, the supply shall be adequately protected by treatment.

b. Frequent sanitary surveys shall be made of the water supply system to locate and identify health hazards which might exist in the system.

c. Approval of water supplies shall be dependent in part upon:

(1) Enforcement of rules and regulations to prevent development of health hazards;

(2) Adequate protection of the water quality throughout all parts of the system, as demonstrated by frequent surveys;

(3) Proper operation of the water supply system under the responsible charge of personnel whose qualifications are acceptable to the Navy Facilities Engineering Command or Navy Ship Systems Command.

(4) Adequate capacity to meet peak demands without development of low pressures or other health hazards; and

(5) Record of laboratory examinations showing consistent compliance with the water quality requirements of these standards.

7. Standards. The limits listed below are generally those contained in Public Health Service Drinking Water Standards, 1962. For sampling procedures and techniques, refer to NAVMED P-5010-5.

a. Bacteriological Quality (Limits). The presence of organisms of the coliform group as indicated by samples examined shall not exceed the following limits:

(1) When 10 ml. standard portions are examined, not more than 10 percent in any month shall show the presence of the coliform group. The presence of the coliform group in three or more 10 ml. portions of a standard sample shall not be allowable if this occurs:

- (a) In two consecutive samples;
- (b) In more than one sample per month when less than 20 are examined per month; or
- (c) In more than five percent of the samples when 20 or more are examined per month.

When organisms of the coliform group occur in three or more of the 10 ml. portions of a single standard sample, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

(2) When 100 ml. standard portions are examined, not more than 60 percent in any month shall show the presence of the coliform group. The presence

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of the coliform group in all five of the 100 ml. portions of a standard sample shall not be allowable if this occurs:

(a) In two consecutive samples;
(b) In more than one sample per month when less than five are examined per month; or
(c) In more than 20 percent of the samples when five or more are examined per month.

When organisms of the coliform group occur in all five of the 100 ml. portions of a single standard sample, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

(3) When the membrane filter technique is used, the arithmetic mean coliform density of all standard samples examined per month shall not exceed one per 100 ml. Coliform colonies per standard sample shall not exceed 3/50 ml., 4/100 ml., 7/200 ml., or 13/500 ml. in:

(a) Two consecutive samples;
(b) More than one standard sample when less than 20 are examined per month; or
(c) More than five percent of the standard samples when 20 or more are examined per month.

When coliform colonies in a single standard sample exceed the above values, daily samples from the same sampling point shall be collected promptly and examined until the results obtained from at least two consecutive samples show the water to be of satisfactory quality.

b. Bacteriological Examination of Water. Bacteriological Examination of Water, DD Form 686, shall be used by all naval facilities, both ashore and afloat, to conduct bacteriological examination of water.

c. Physical Characteristics (Limits). Drinking water should contain no impurity which would cause offense to the sense of sight, taste, or smell. Under general use, the following limits should not be exceeded:

Turbidity.	5 units
Color.	15 units
Threshold Odor Number.	3

d. Chemical Characteristics (Limits). Drinking water shall not contain impurities in concentrations which may be hazardous to the health of the consumer. It should not be excessively corrosive to the water supply system. Substances used in its treatment shall not remain in the water in concentrations greater than required by good practice. Substances which may have deleterious physiological effect, or for which physiological effects are not known, shall not be introduced into the system in a manner which would permit them to reach the consumer.

(1) The following chemical substances should not be present in a water supply in excess of the listed concentrations where, in the judgement of the Navy Facilities Engineering Command and the Bureau of Medicine and Surgery, other more suitable supplies are or can be made available.

Substance	Concentration in mg/1 (ppm)	
Antimony (Sb) (See footnote 1.)	0.01	
Arsenic (As)	0.01	
Chloride (C1)	250.	
~~Carbon Chloroform Extract (CCE)~~	~~0.15~~	*
Copper (Cu)	1.	
Cyanide (CN)	0.01	
Fluoride (F)	See 7d(3)	
Iron (Fe)	0.3	
Manganese (Mn)	0.05	
Mercury (Hg) (See footnote 2.)	0.005	
Methylene Blue-Active Substance (Including ABS)	0.5	*
Nitrate (NO_3), Nitrite (NO_2) (See footnote 3.)	10.	*
pH (Range)	6.0 - 9.0	*
Phenols	0.001	
Sulfate (SO_4)	250.	
Total Dissolved Solids	500.	
ZINC (Zn)	5.	

Footnotes:

1. Not contained in Drinking Water Standards but this limit set by PHS and BUMED.

2. Not contained in Drinking Water Standards but this limit set by BUMED upon recommendation of EPA. *

3. In areas in which the nitrate or nitrite content of water is known to be in excess of the listed concentration, * the public should be warned of the potential dangers of using the water for infant feeding.

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(2) The presence of the following substances in excess of the concentrations listed shall constitute grounds for rejection of the supply:

Substance	Concentration in mg/l (ppm)
Antimony (Sb) (See footnote 1.)	0.05
Arsenic (As)	0.05
Barium (Ba)	1.0
Cadmium (Cd)	0.01
Chromium (Hexavalent) (Cr^{+6})	0.05
Cyanide (CN)	0.2
Fluoride (F)	See 7d(3)
Lead (Pb)	0.05
Pesticides, Herbacides, Fungicides (See footnote 2.)	
Chlorinated hydrocarbons	0.003 - 0.1
Organo-phosphates	0.1
Chlorophenoxy herbacides	0.005 - 1.00
Selenium (Se)	0.01
Silver (Ag)	0.05

Footnotes:

1. Not contained in Drinking Water Standards but this limit set by PHS and BUMED.

2. Concentrations represent range of levels for each group of chemicals. Individual pesticides have specific concentrations [illegible] queries should be directed to BUMED (Code 72).

(3) **Fluoride.** When fluoride is naturally present in drinking water, the concentration should not average more than the appropriate upper limit in the following table. Presence of fluoride in average concentrations greater than two times the optimum values in the table shall constitute grounds for rejection of the supply. When fluoridation (supplementation of fluoride in drinking water) is practiced, the average fluoride concentration shall be kept within the upper and lower control limits in the table.

Annual average of maximum daily air temperatures, based on data obtained for a minimum of 5 years	Recommended control limits-Fluoride concentrations in mg/l (ppm).		
	Lower	Optimum	Upper
50.0 - 53.7	0.9	1.2	1.7
53.8 - 58.3	0.8	1.1	1.5
58.4 - 63.8	0.8	1.0	1.3
63.9 - 70.6	0.7	0.9	1.2
70.7 - 79.2	0.7	0.8	1.0
79.3 - 90.5	0.6	0.7	0.8

e. Physical and Chemical Analysis of Water. Physical and Chemical Analysis of Water, DD Form 710, shall be used by all naval facil[illegible] ashore and afloat, to conduct physical and chemical analysis of water.

(6)

f. Radioactivity (Limits).

(1) The effects of human radiation exposure are viewed as harmful and any unnecessary exposure to ionizing radiation should be avoided. Approval of water supplies containing radioactive materials shall be based upon the judgement that the radioactivity intake from such water supplies when added to that from all other sources is not likely to result in an intake greater than the radiation protection guidance recommended by the Federal Radiation Council and approved by the President. (The Federal Radiation Council, in its 13 September 1961, Memorandum for the President, recommended that "Routine control of useful applications of radiation and atomic energy should be such that expected average exposures of suitable samples of an exposed population group will not exceed the upper value of Range II (20 μμc/day of Radium-226 and 200 μμc/day of Strontium-90).") Water supplies shall be approved without further consideration of other sources of radioactivity intake of Radium-226 and Strontium-90 when the water contains these substances in amounts not exceeding 3 and 10 μμc/liter, respectively. When these concentrations are exceeded, a water supply shall be approved by the certifying authority if surveillance of total intakes of radioactivity from all sources indicates that such intakes are within the limits recommended by the Federal Radiation Council for control action.

(2) In the known absence (taken here to mean a negligibly small fraction of the above specific limits, where the limit for unidentified alpha emitters is taken as the listed limit for Radium-226) of Strontium-90 and alpha emitters, the water supply is acceptable when the gross beta concentrations do not exceed 1,000 μμc/liter. Gross beta concentrations in excess of 1,000 μμc/liter shall be grounds for rejection of supply except when more complete analyses indicate that concentrations of nuclides are not likely to cause exposures greater than the Radiation Protection Guides as approved by the President on recommendation of the Federal Radiation Council.

8. Technical Assistance. Assistance with potable water problems may be requested from the following:

~~a. Environmental and Preventive Medicine~~ Units in accordance with BUMED Instruction 6200.3C series, Subj: Environmental and Preventive Medicine Units.

b. Navy Facilities Engineering Command's Field Engineering Offices in accordance with current NAVFAC Instruction 5450.19 series, Subj: Sanitary Engineering Responsibilities of the Naval Facilities Engineering Command Field Division.

9. Procurement of DD Form 686 and DD Form 710. DD Form 686, Bacteriological Examination of Water, and DD Form 710, Physical and Chemical Analysis of Water, may be obtained from Cognizance I stock points of the Navy Supply System.

G. M. DAVIS

Distribution:
SNDL Parts 1 and 2
MARCORPS Code CC (less MarBks)

Stocked:
COMNAVDIST WASH DC
(Supply & Fiscal Dept—Code 514.3)
Wash. Navy Yard
Wash., D.C. 20390

(7)

Exhibit # 20

This Table Shows Significant Inaccuracies in ATSDR's HazDat Database, Sample of 5 Data Points

Site	**HazDat Database**	**ATSDR Response**
Nebraska Ordnance Plant	630,000 ppb TCE in municipal/public groundwater contamination	**HazDat is wrong.** TCE contamination was far less - 700ppb
Mather Air Force Base	800 ppb TCE in municipal/public groundwater contamination	**HazDat is wrong.** TCE contamination was not in municipal/public groundwater, it was in a monitoring well.
Air Force Plant #4	11,000 ppb TCE in municipal/public groundwater contamination	**HazDat is wrong.** TCE contamination was not in municipal/public groundwater, it was a monitoring well.
McClelland Air Force Base	2,000 ppb TCE in municipal/public groundwater	**HazDat data correct.**
Wurtsmith Air Force Base	1,100 ppb TCE in tap water	**HazDat data correct.**

Exhibit 21

6/11/07 Preliminary Information in Response to 6/6/07 Letter Requesting Information re:
Department of Defense Sites with Private or Municipal Well Water Contamination (Specifically, Tetrachloroethylene and Trichloroethylene Contamination)

Site Name	Contaminant	Maximum Level	Private Well/ Municipal Wells	Estimated Exposed Population	Estimated Exposed Population
American Lake Gardens (U.S. Air Force)	PCE[1] TCE[2]	Not Reported 41 ppb[3] 4.5 ppb	Not Reported Private Wells Municipal Wells	3,000 – 10,000	No time-lines provided. Restoration began in 1985, and public water had been provided by that time.
Camp Lejeune (Marine Corps)	PCE TCE	215 ppb 1,400 ppb	Municipal Wells Municipal Wells	Up to 1,000,000 (about 85,000 at Tarawa Terrace)	29 years
Defense General Supply Center (Defense Logistics)	PCE TCE	4.9 ppb 5.2 ppb	Private Wells Private Wells	84	No estimate. Center opened in 1942. Contamination found and alternate supply offered in 1987.
Ellsworth Air Force Base	PCE TCE	Not Reported 24.5 ppb	Not Reported Private Wells	6	10 years maximum
Fort Lewis (U.S. Army)	PCE TCE	6 ppb 41 ppb	Private Wells Private Wells	20	No estimate. Post opened in 1917. Contamination was found in 1985, and alternative water was made available in 1985.
Fort Riley (U.S. Army)	PCE TCE	330 ppb 96 ppb	Private Wells Private Wells	2,550	No estimate. Wells on-line in 1928, 1943, and 1958 with oldest ones replaced in 1993 and signs posted at off-site well in 1993. Contamination found in 1981.
Griffiss Air Force Base	PCE TCE	6.9 ppb Not Reported	Private Wells Not Reported	95	No estimate. Base operated from 1942—1995. Contamination (low levels) was found in 1982 and continued until 1989 (7 years known exposure, years prior to 1982 unknown).

Table continued from page 1

Site Name	Contaminant	Maximum Level	Private Well/ Municipal Wells	Estimated Exposed Population	Estimated Exposed Population
McClellan Air Force Base	PCE TCE	4 ppb 55 ppb	Private Wells Private Wells	16,540	No estimate. Base opened in 1938. Contamination found in 1979. Most homes put on public water by 1986.
Rocky Mountain Arsenal (U.S. Army)	PCE TCE	14.7 ppb Not Reported	Private Wells Not Reported	30,207	No estimate, but likely less than 5 years. Sampling began in 1985 and contamination was first found in 1990. Bottled water was offered in 1990.

[1] PCE = Tetrachloroethylene
[2] TCE = Trichloroethylene
[3] ppb = parts per billion

EXHIBIT 22

MUNICIPAL/PUBLIC TAP WATER CONTAMINATED WITH TCE AT CONCENTRATIONS ABOVE EPA MCL 5 PPB

DOORMA DOOR CONTROLS INC HSCA PAD002295376 17 parts per billion (ppb)

FORMER HULETT LAGOON MOSFN0703530 23.7 parts per billion (ppb)

GEAUGA INDUSTRIES OHD061722575 30 parts per billion (ppb)

GRAFTON WISCONSIN RESIDENTIAL WELL WI0001906981 200parts per billion (ppb)

BOHN HEAT A-C&R DV ILD065243172 730 parts per billion (ppb)

HAWTHORNE MUNICIPAL WELLS NJD980771679 48.6 parts per billion (ppb)

ICELAND COIN LAUNDRY AREA GW PLUME NJ0001360882 41.7 parts per billion (ppb)

LEE CHEMICAL MOD980853519 36 parts per billion (ppb)

NEWTON COUNTY WELLS MOD985798339 190 parts per billion (ppb)

SOL LYNN/INDUSTRIAL TRANSFORMERS TXD980873327 953,000 (ppb)

VEGA ALTA PUBLIC SUPPLY WELLS PRD980763775 42 parts per billion (ppb)

Groundwater Used as Municipal/Public Drinking Water Contaminated with TCE at Concentrations Above EPA MCL 5ppb

ARIVEC CHEMICALS INC GAD990740714 39000 parts per billion (ppb)

AVCO LYCOMING (WILLIAMSPORT) PAD003053709 250 parts per billion (ppb)

BALLY GROUND WATER PAD061105128 1127 parts per billion (ppb)

BREWSTER WELL FIELD NYD980652275 77parts per billion (ppb)

CARRIER AIR CONDITIONING CO. TND044062222 8.8 parts per billion (ppb)

CHARLEVOIX MUNICIPAL WELL MID980794390 100 parts per billion (ppb)

CLARE WATER SUPPLY MID980002273 1400 parts per billion (ppb)

CROSSLEY FARM PAD981740061 20000 parts per billion (ppb)

CSX/LEWISBURG DERAILMENT TND987775566 45300 parts per billion (ppb)

DELAVAN MUNICIPAL WELL #4 WID980820062 1300 parts per billion (ppb)

FARIBAULT MUNI WELL FIELD MND982074569 180 parts per billion (ppb)

FRIDLEY COMMONS PARK WELL MND985701309 79 parts per billion (ppb)

FULTON AVENUE NY0000110247 1000 parts per billion (ppb)

GEIGY CHEMICAL CORP. (ABERDEEN) NCD981927502 330 parts per billion (ppb)

GROVELAND WELLS MAD980732317 118.8 parts per billion (ppb)

HAWTHORNE MUNICIPAL WELLS NJD980771679 572 parts per billion (ppb)

HOOKER CHEMICAL & PLASTICS CORP NYD002920312 87 parts per billion (ppb)

INDIAN BEND WASH AREA AZD980695969 1400 parts per billion (ppb)

INDUSTRIAL LATEX CORP. NJD981178411 89 parts per billion (ppb)

INDUSTRIAL WASTE PROCESSING CAD980736284 390 parts per billion (ppb)

JACKSON STEEL NYD001344456 250 parts per billion (ppb)

KELLOGG-DEERING WELL FIELD CTD980670814 600 parts per billion (ppb)

KENTUCKY AVENUE WELL FIELD NYD980650667 130 parts per billion (ppb)

LASALLE ELECTRIC UTILITIES ILD980794333 5 parts per billion (ppb)

LIBERTY INDUSTRIAL FINISHING NYD000337295 16 parts per billion (ppb)

LODI MUNICIPAL WELL NJD980769301 324.0 parts per billion (ppb)

MAYWOOD CHEMICAL CO. NJD980529762 324.0 parts per billion (ppb)

METALTEC/AEROSYSTEMS NJD002517472 5140 parts per billion (ppb)

MOSES LAKE WELLFIELD WAD988466355 32.2 parts per billion (ppb)

NORTH PENN - AREA 7 PAD002498632 190 parts per billion (ppb)

NORTH RAILROAD AVENUE PLUME NMD986670156 8.3 parts per billion (ppb)

OAK GROVE VILLAGE WELL MOD981717036 70.8 parts per billion (ppb)

OGALLALA GROUND WATER NED986369247 220 parts per billion (ppb)

OLD ROOSEVELT FIELD NYSFN0204234 170 parts per billion (ppb)

PALERMO WELL FIELD WA0000026534 15.0 parts per billion (ppb)

PASLEY SOLVENTS & CHEMICALS, INC NYD991292004 145 parts per billion (ppb)

PETOSKEY MUNICIPAL WELL FIELD MID006013049 1000 parts per billion (ppb)

PINE STREET DUMP MND985739051 48 parts per billion (ppb)

POTTER CO. MSD056029648 848 parts per billion (ppb)

RAILROAD AVENUE GROUNDWATER IA0001610963 6.8 parts per billion (ppb)

REICH FARMS NJD980529713 33 parts per billion (ppb)

ROCKY HILL MUNICIPAL WELL NJD980654156 650 parts per billion (ppb)

ROCKAWAY TOWNSHIP WELLS NJD980654214 362 parts per billion (ppb)
RODALE MANUFACTURING CO. PAD981033285 150 parts per billion (ppb)
SAEGERTOWN INDUSTRIAL AREA PAD980692487 310 parts per billion (ppb)
SAN GABRIEL VALLEY (AREA 1,2,3,4) CAD980818512 1800parts per billion (ppb)
SAN FERNANDO VALLEY (AREA 1) CAD980894893 18000 parts per billion (ppb)
SAVAGE MUNICIPAL WATER SUPPLY NHD980671002 244 parts per billion (ppb)
SOLID STATE CIRCUITS, INC. MOD980854111 290 parts per billion (ppb)
SOUTH MUNICIPAL WATER SUPPLY NHD980671069 25 parts per billion (ppb)
SPACE ORDNANCE SYSTEMS SAND CYN 511 parts per billion
STURGIS MUNICIPAL WELLS MID980703011 152 parts per billion (ppb)
TOWN GARAGE/RADIO BEACON NHD981063860 148.4 parts per billion (ppb)
TUCSON INTERNATIONAL AIRPORT AZD980737530 2200 parts per billion (ppb)
TUTU WELLFIELD VID982272569 711 parts per billion (ppb)
VALLEY PARK TCE MOD980968341 600 parts per billion (ppb)
VEGA ALTA PUBLIC SUPPLY WELLS PRD980763775 574 parts per billion (ppb)
VESTAL WATER SUPPLY WELL 4–2 NYD980652267 974 parts per billion (ppb)
WAITE PARK WELLS MND981002249 5100 parts per billion (ppb)
WELLS G&H MAD980732168 267.40000 parts per billion (ppb)
WHITEHALL MUNICIPAL WELLS MID980701254 68 parts per billion (ppb)
ZANESVILLE WELL FIELD OHD980794598 330 parts per billion (ppb)

Source of information: ATSDR HazDat Database